

BLUE BOOK

SERVING THE METAL WORKING INDUSTRY SINCE 1906

JUNE 1949

THE MONTH

Fundamental Principles of Drawing Dies

Welding a Flaring Case

New Engine Lathes Skishes Machining

Time on Steel Mill Rolls

Metal's Handling at Reliance Electric

NMTA Sales Booster Course

What's New in Metalworking

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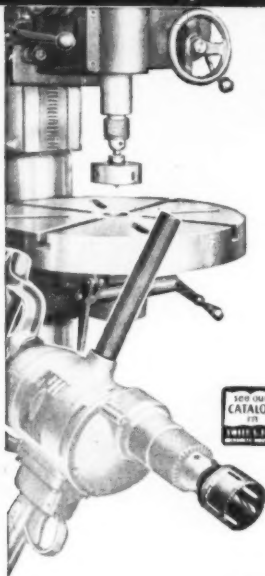
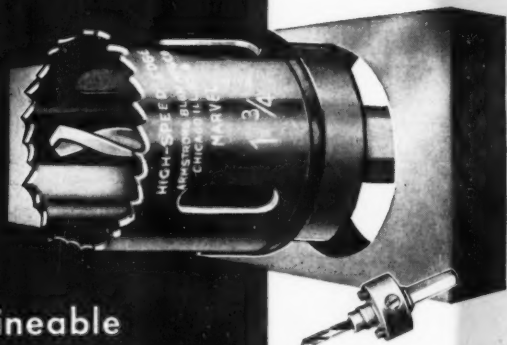
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A HITCHCOCK PUBLICATION

Cut...

LARGE HOLES

... thru any machineable material up to **ONE INCH** thick!



Here is a premium tool which makes it possible to saw holes in one short operation ... large holes which heretofore had to be laboriously machined "a-chip-at-a-time."

MARVEL High-Speed-Edge Hole Saws have strength to withstand the terrific peripheral strains of heavy duty operation in lathes, drill presses or portable power tools. They have a high speed steel cutting edge which is electrically welded to a tough, alloy steel body, high speed steel pilot drills, heavy hexagonal shanked arbors and sufficient set for deep drilling. They are self-aligning, as the larger diameter saws float on their arbors and are driven by double drive pins. They will saw round holes accurately in any machineable material.

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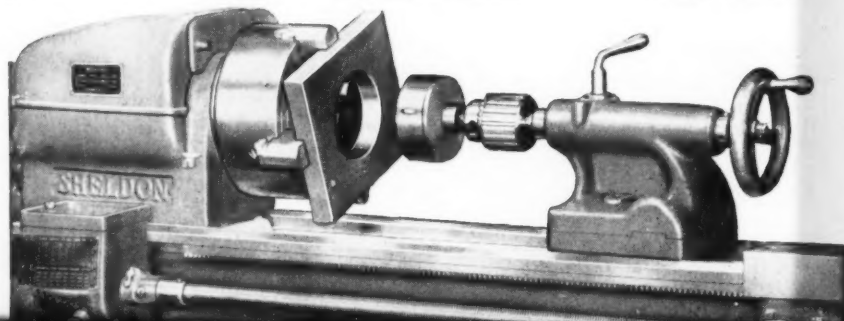


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"The Hack Saw People"

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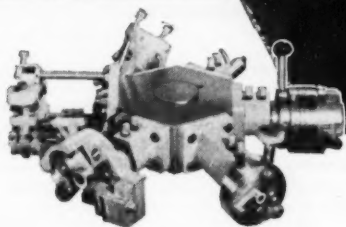
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Faster, for Less...with
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Tapping and Threading Machines.**

Warner & Swasey standard turret lathe tools, and Universal Tooling Setups, can increase your production as they have in many other shops. Write today for the 184-page book, "Turret Lathe Tools" which clearly and simply explains Universal Tooling principles for bar and chucking work, combined and multiple cuts, and applications of modern tooling. Use this handy coupon!

Department 320

Warner & Swasey, Cleveland 3, Ohio

Please send my free copy of "Turret Lathe Tools" today!

Name

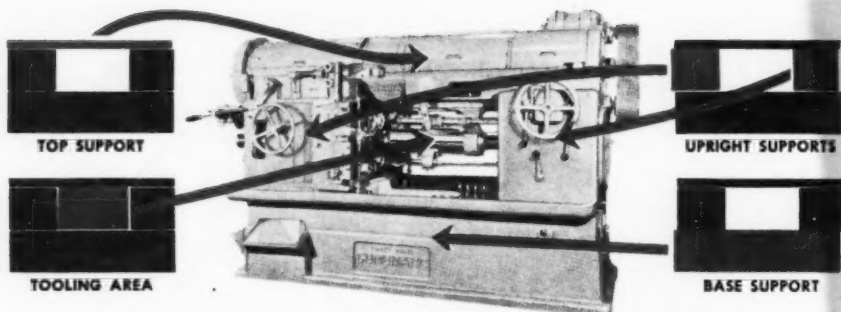
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When Writing Advertisers Please Mention MACHINE and TOOL BLUE BOOK



GOOD DESIGN IS CONSISTENTLY GOOD

All builders of horizontal type multiple spindle automatic bar machines emphasize the importance of substantial frame support to maintain work and tool alignment and insure durable low-cost machine performance. Some have stressed the advantages of box-type frame design and construction. But only Cone has consistently applied these fun-

damentals by providing a horizontal, rectangular tooling area for a horizontal type machine.

Two frame designs for horizontal type multiple spindle automatics were submitted to automatic users to meet the general requirements here listed. The 100% choice is illustrated above. The Conomatic is its sole representative.

	MACHINE #1	MACHINE #2	MACHINE #3	MACHINE #4	MACHINE #5
WORK & TOOL CAPACITY	✓				
WORK & TOOL SUPPORT	✓				
WORK & TOOL MAINTENANCE	✓				

*CONOMATIC

Any good investment has certain qualifications that prove it profitable. The wise investor and smart banker have some sort of measuring stick to analyze every investment they make. Why not use a chart to guide your purchases of Automatic Bar Machines? If you are already using a chart, perhaps you would like to compare it with the one that we have prepared. Write to us for a copy or ask your Cone representative.

WORK & TOOL CAPACITY

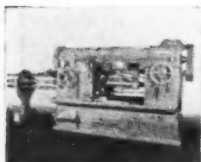
Long, open, roomy Tooling Area and long main end slide for handling longer work and for clearing die heads in threading, etc., to the full collet capacity of the machine; for heavy cross-slide cuts, deep hole drilling, and general all-round work with HSS or Carbide Tools.

WORK & TOOL SUPPORT

Genuine, horizontal, rectangular box-frame free of overhang; heavy-set, rigid upright members for supporting headstock and gear box units between heavy, full-length top and base members, for substantial support of all work and tools close to the work and tool axis, and for the maintenance of accurate alignment of work and tools.

WORK & TOOL MAINTENANCE

Heavy, strong, well supported, overhang-free, vibration-free, liberal bearing, convenient, adjustable, work holding units and tool slides, with accessible chip-free cams, with adequate capacity in base member for chip disposal and cutting coolant.



A comparison with ALL Automatics
will lead you to

Conomatic

CONE AUTOMATIC
MACHINE COMPANY, INC.
WINDSOR, VT., U.S.A.

#2

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ELMIRA, N.Y.

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Write for Bulletin No. 48 for complete ordering information, dimensions and prices.



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for the toughest steels!



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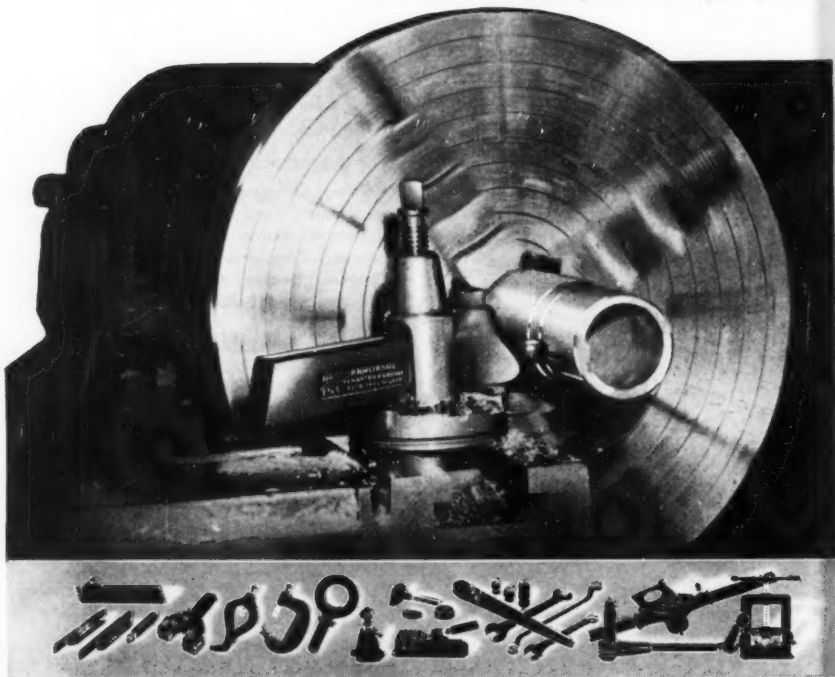
The "Armstrong System" provides special ARMSTRONG TOOL HOLDERS for ARMALLOY (cast alloy) and for ARMIDE (carbide-tipped) cutters. With these modern cutting tools, the toughest and hardest steels are easily machined. Far heavier feeds and the extremely high cutting speeds become practical (300 f.p.m. with ARMALLOY cutters; 600 f.p.m. with ARMIDE cutters). Delays for tool re-grinding are reduced to an absolute minimum—edges hold up to 100 times as long.

These new tool holders and cutters are stocked by your local ARMSTRONG industrial distributors.

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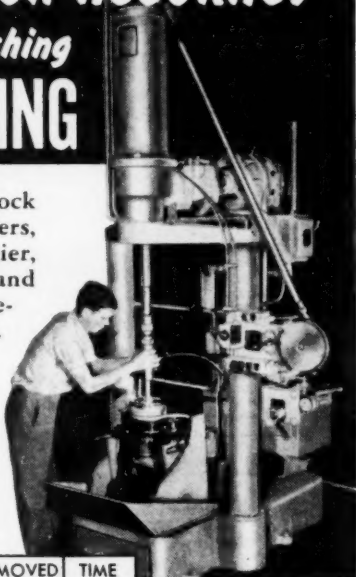
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WITH Fulmer Honing Machines, stock can be removed from internal cylinders, $\frac{1}{2}$ " to 30" diam., much faster, easier, cheaper, than by any other method, and maintain high accuracy. Stock removal ranges over 90 cu. in. per hour. Hold to $\pm .0001$ " tolerances on bore size, straightness, roundness, with any desired surface finish.

**CHECK THESE TYPICAL PRODUCTION
EXAMPLES OF FAST STOCK REMOVAL
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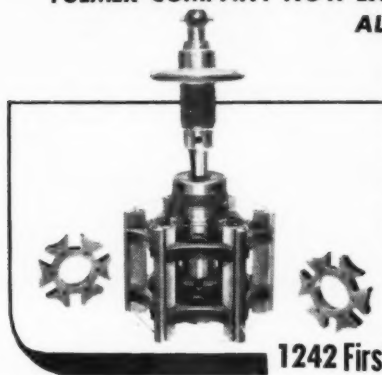
PIECE	LENGTH	DIAMETER	STOCK REMOVED	TIME
Hardened Pump Liner	27"	7.250" $\pm .0005$ "	.015"—.018"	10 min.
Forged Gear Blank	Two 6" Bores	4.250" $\pm .0002$ "	.005"	1 min.
Chrome Plated Diesel Liner	32"	8.500" $\pm .0005$ "	.004"—.006" of chrome	3 min.



(Above) Fulmer Model 10-25, honing $5\frac{3}{4}$ " bore aircraft cylinder, removing .006" of stock. Rate: 24 cyl. per hour.

**FULMER COMPANY NOW EXCLUSIVE U. S. DISTRIBUTOR FOR
ALEXANDER BALL HONING TOOLS**

Available in sizes from $\frac{1}{2}$ " to 50" diam.



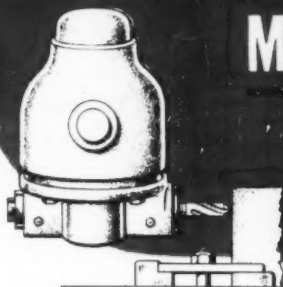
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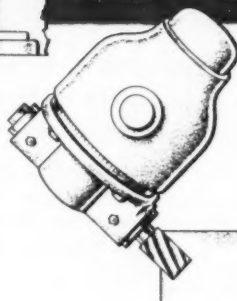
1242 First National Bank Bldg., Cincinnati 2, Ohio

Jack of all Trades...

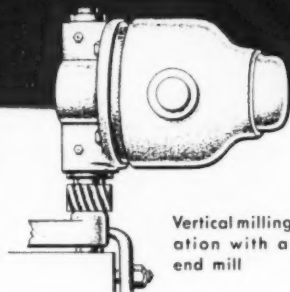
CINCINNATI UNIVERSAL SPIRAL MILLING ATTACHMENT



Drilling the end of a large part, using the longitudinal table feed



Milling a dovetail with a helical end milling cutter



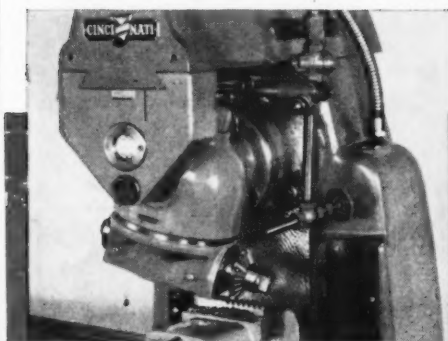
Vertical milling operation with a shell end mill



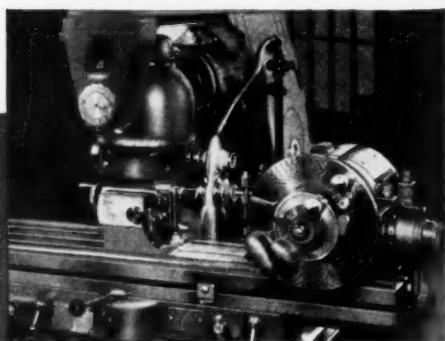
THE CINCINNATI MILLING MACHINE CO.

CINCINNATI 9, OHIO, U. S. A.

MILLING MACHINES • BROACHING MACHINES • CUTTER SHARPENING MACHINES



The double swivel arrangement is used to advantage in milling the teeth of this broach insert

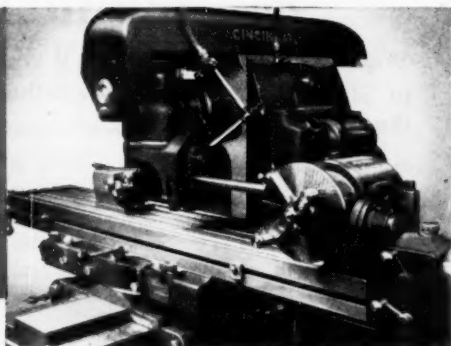


Milling a worm, on a CINCINNATI Miller equipped for short leads

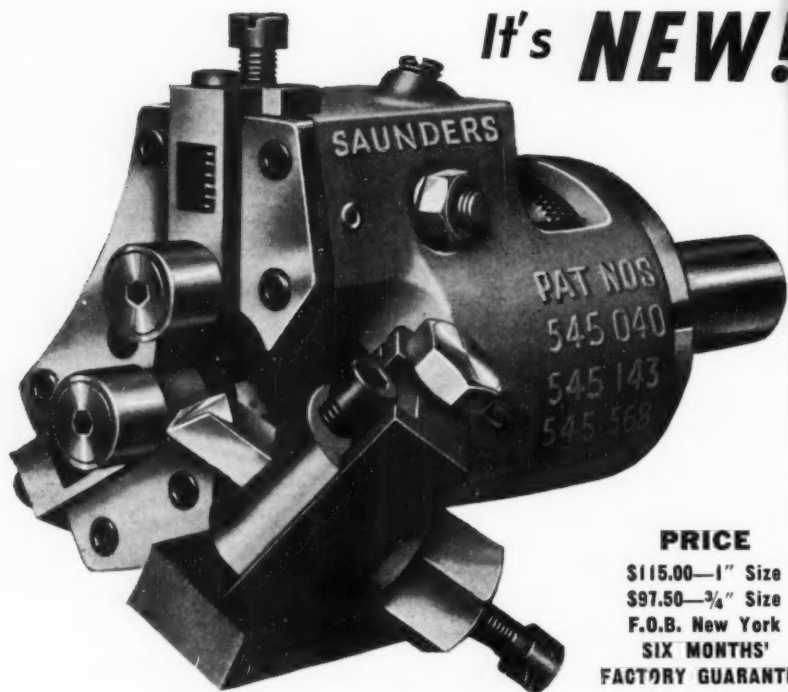
● A veritable jack of all trades, the CINCINNATI Universal Spiral Milling Attachment is master of them, too. It greatly extends the versatility of CINCINNATI Plain and Universal Millers... in the toolroom... in the production line. A few of its many uses are shown here. ¶ The attachment can be swiveled 360° in two planes; has a one to one spindle speed ratio; No. 10 B & S taper hole in the spindle; can be easily set up and removed as desired. Complete details will be found in catalog M-804-1.



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Here, a special spindle carrier acts as a "follower" to support the work under the cutter



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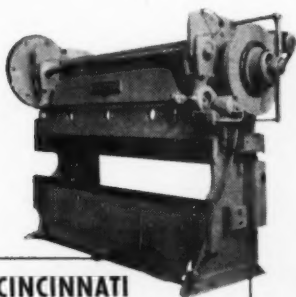
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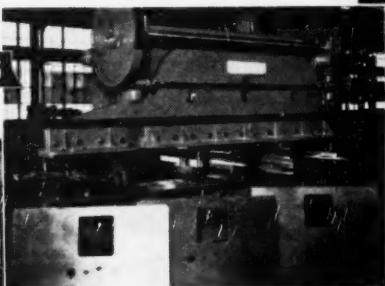
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MULTIPLE OPERATIONS

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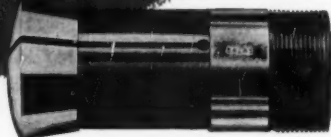
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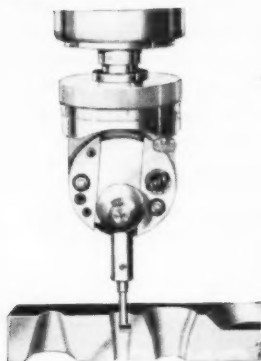




"SPEED UP YOUR TOOL WORK
WITH THIS VERSATILE

**TREE
UNIVERSAL
MILLING
ATTACHMENT"**

• Here's a truly versatile universal milling attachment that's quality built. . . . A precision unit that can do your milling, drilling or boring operations . . . AT ANY ANGLE . . . Its greater capacity enables use of tools with shanks up to $\frac{3}{4}$ " . . . Equipped with a power feed . . . which can be engaged at any point of the stroke. Compact design . . . 4" quill travel . . . Eight speeds—140 to 3500 RPM or 210 to 5200 RPM. Hardened and ground spindle, and quill . . . Enclosed micrometer depth stop. Write for complete specifications today.



and you can cut taper hole costs
with this amazing new

TREE TAPER BORING TOOL!!

Here's a revolutionary boring tool for the milling machine, jig borer and boring bar—that not only bores taper holes, but can also be used for facing, straight boring and outside turning. . . .

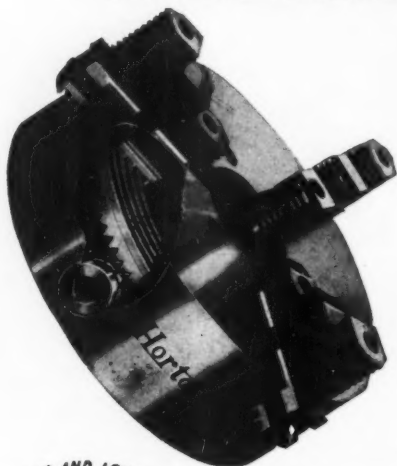
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TREE TOOL and DIE WORKS

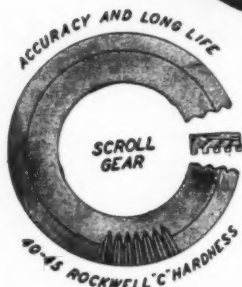
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Horton

CHUCK MANUFACTURERS SINCE 1851



LET'S LOOK INSIDE A HORTON SCROLL UNIVERSAL CHUCK



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Horton hardens and draws their scrolls to 40 - 45 Rockwell "C". By doing the finish machining and grinding on the scroll threads and bore after hardening, the ultimate in strength and accuracy is obtained. Users may expect a long accurate life because of this and many other Horton "extras".

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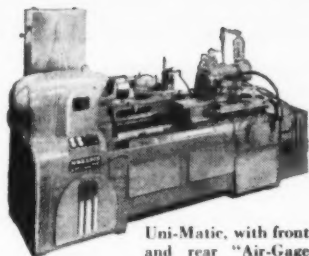
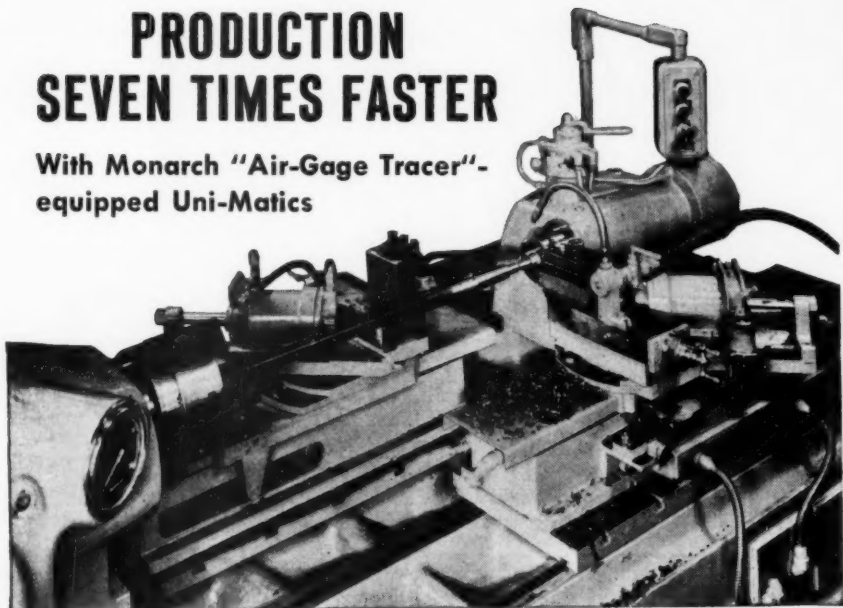
HORTON ALSO CARRIES A COMPLETE LINE OF INDEPENDENT CHUCKS, COMBINATION CHUCKS, TWO-JAW CHUCKS, ELECTRIC POWER CHUCKS AND DRILL CHUCKS.

Regularly sold through industrial distributors.

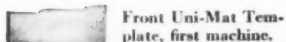
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WINDSOR LOCKS, CONN. U. S. A.

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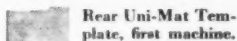
With Monarch "Air-Gage Tracer"-
equipped Uni-Matics



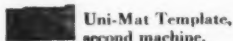
Uni-Matic, with front
and rear "Air-Gage
Tracer" Uni-Mats.



Front Uni-Mat Tem-
plate, first machine.



Rear Uni-Mat Tem-
plate, first machine.



Uni-Mat Template,
second machine.

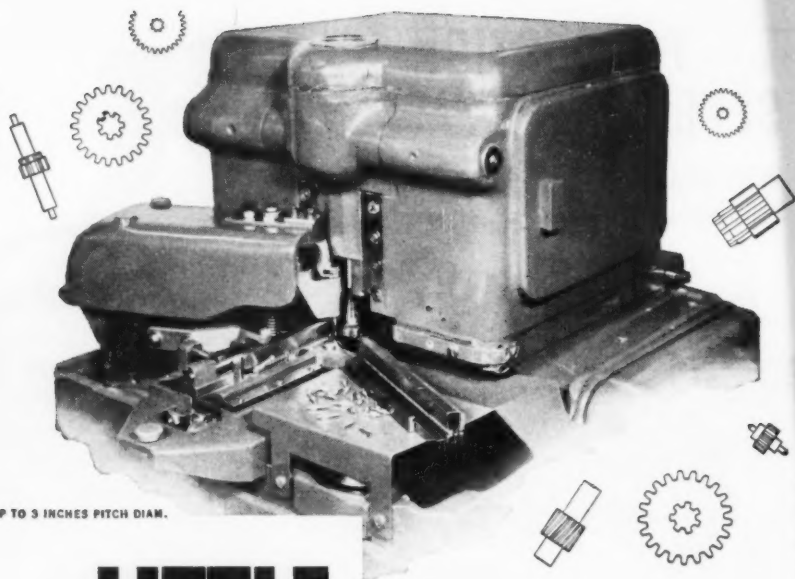
One operator, tending two Monarch Uni-Matics, "Air-Gage Tracer"-equipped, turns out these axles in a floor-to-floor time of $1\frac{1}{4}$ minutes. In the installation obsoleted by the Uni-Matics, the same operator had to tend *four* multiple tool automatics—and the floor-to-floor time was $4\frac{1}{2}$ minutes per shaft. That's a per-machine production rate 7.2 times faster for the Uni-Matics!

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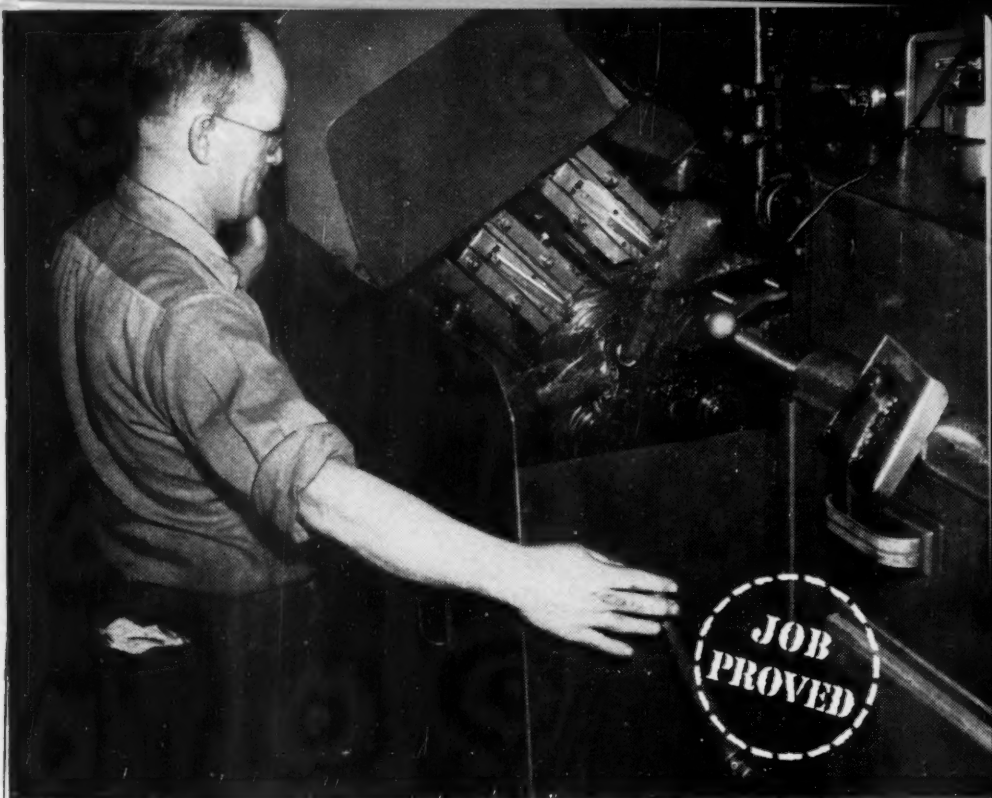
LITTLE GEARS

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and at Low
Cost**

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Fellows

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Cutting Speed: 156 S.F.P.M.

Cycle Time: 9.9 seconds

Production: 368 pieces per hour per machine

A manufacturer of wrenches was using two oils in his automatic screw machines—a dark cutting oil and a lubricating oil. Replacing both with one grade of new Sunicut with Petrofac, he found the way to many benefits. Savings have been substantial. Dilution of cutting oil through seepage

is no longer possible. Drain-off from chips is increased. There is only one oil to buy, store and handle. Finish is better, tool life longer, work visibility improved.

The new Sunicut grades with Petrofac possess superior metal-wetting, antiweld and extreme-pressure qualities. They are not blended with animal or vegetable fatty oils—cannot turn rancid. For more information write for folder MT-6.

SUN OIL COMPANY • Philadelphia 3, Pa.

In Canada: Sun Oil Company, Ltd.

Toronto and Montreal

SUN PETROLEUM PRODUCTS

"JOB PROVED" IN EVERY INDUSTRY



*Petrofac is a trademark of Sun Oil Company

Can you take advantage of this **REAL ECONOMY?**

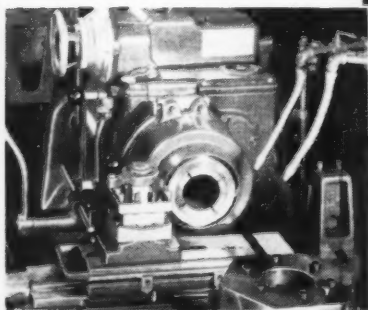
**THIS
2"
TURRET
LATHE**

GISHOLT No. 4 UNIVERSAL RAM TYPE TURRET LATHE

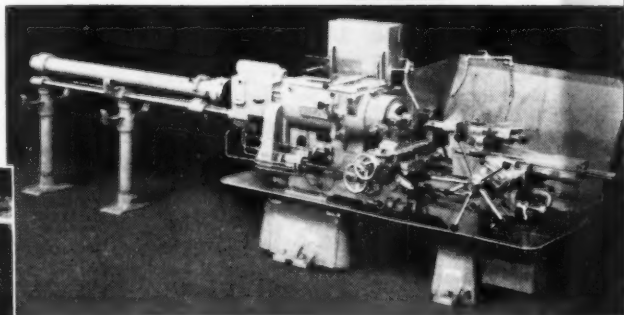
You don't have to invest in expensive heavy-duty lathes to handle large diameter work of this nature. Here is the ideal lathe to machine tubing, plastics, or lightweight bar stock such as aluminum. You can use it for softer metals like brass, too.

The Gisholt No. 4 Ram-Type Turret Lathe (normally 2" bar capacity) can be furnished with a larger spindle bore providing $4\frac{1}{2}$ " round collet capacity. This machine gives you all the modern operating advantages which mean high speed production and low costs. It may be the economical solution to your problem. Ask your nearest Gisholt representative about it. Or write us for complete information.

GISHOLT MACHINE COMPANY
Madison 10, Wisconsin



The Gisholt No. 4 Ram-Type Turret Lathe with $4\frac{1}{2}$ " round collet capacity and equipped with $4\frac{1}{2}$ " bar feed. (At left) Close-up view of $4\frac{1}{2}$ " capacity collet chuck. This machine is ideal for large diameter tubing.



THE GISHOLT ROUND TABLE represents the collective experience of specialists in machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.



TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • SPECIAL MACHINES

GEAR PRODUCTION

HIGHLIGHTS

No. 103

Cutting-Shaving-Checking-Lapping

MICHIGAN TOOL COMPANY
7171 E. McNICHOLS RD. • DETROIT 12, MICH.

15 to 1 Output Ratio on Shear-Speed vs. Hobber

A single Michigan Tool Shear-Speed gear shaper is currently turning out 130 five-pitch, 15-tooth, 3-inch diameter, $\frac{1}{2}$ -inch face gears per hour, approximately 15 times the production formerly obtained on the same part on a hobbing machine.

To obtain this production, all the teeth on four blanks are cut simultaneously, compared with six blanks cut on one arbor on the former hobbing machine setup.

Tool life is reported highly satisfactory with some 1200 parts being produced per grind. Since .010 to .012 inch is removed in sharpening the form tools, about 40 resharpenings are possible, for a total output of 48,000 gears per set of tools.

Fig. 1 shows the machine just after finishing a load of four blanks in around one minute cutting time. The operator is about to remove the finished gears. Fig. 2 shows four finished gears, four of the blanks from which they are cut, a Shear-Speed tool head as it looks from below, and one of the single point form tools used in the head.

To change tools, the head is lowered slightly, the tools are slipped out, and another set is inserted. Tools are sharpened by grinding the top face to master gage height on a surface grinder.

Practice is to remove a set of tools each day, or after each 1200 pieces, for sharpening. Theoretically, somewhat longer tool life per sharpening could be obtained. However, this would call for removing tools for grinding at irregular periods.

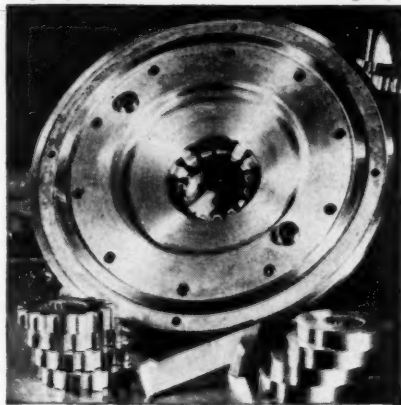
Material of the gear is SAE 1115, heat-treated after cutting. The part is used as a ratchet lock for a hand-brake inside an automobile transmission.

For Shear-Speed machine details, write Michigan Tool Company for Bulletin SS-48-3.



Fig. 1 ↑

Fig. 2 ↓



AXELSON FIRST CHOICE

MASTER MACHINISTS AGREE...there is no finer engine lathe than an AXELSON. Designed by men who are themselves master tool makers, AXELSON lathes embody the features that contribute to faster production, more accurate work, easier and safer operation, and maximum versatility.



MASTERPIECE OF PERFECTION



THE "FEEL" OF PERFECTION...is immediately apparent the first time a machinist puts the tool to the work in an AXELSON lathe. Velvet-smooth control action...more positive flow of power at the cutting tool without vibration or chatter.

PRACTICAL VERSATILITY...permits a wide variety of operations with all types of tools, on any kind of stock...two-speed tailstock...wide range of feeds and speeds instantly available.

THE TOOL CARRIES THROUGH...with precision accuracy from the beginning to the end of each cut. Massive construction throughout to maintain absolute alignment...perfectly mated bearing surfaces on slides and ways.

BUILT-IN SAFETY...protects operator from injuries, tools from breakage, and work from reject bin. All controls within easy sight and reach of operator.



AXELSON *Lathes*

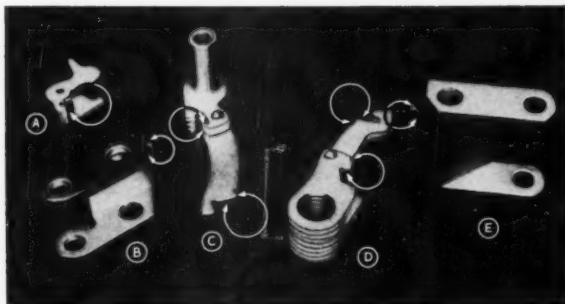
DEPENDABLE FOR A THIRD OF A CENTURY

AXELSON Manufacturing Co., Los Angeles 11 • New York 7 • St. Louis 16

Authorized Distributors In All Principal Industrial Sections

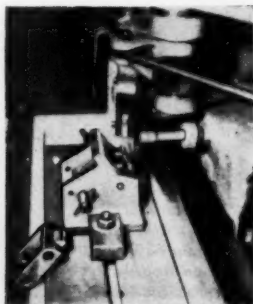
How to take the guesswork out of contour-grinding

Moore Panto-Crush Wheel Dressers Step Up Latch Output 30% for I-T-E, Assure Interchangeability of Parts.



Five principal I-T-E circuit breaker parts finish ground with Moore Panto-Crush Wheel Dresser. Surface areas between arrows are ground. A comparison of pieces per hour between new method and old method follows:

Part	Moore Panto-Crush	Old Method	Saving
A	22	15	33%
B	32	22	31%
C	31	18	42%
D	14	12.5	10%
E	25	17	32%



Contour grinding of latch level—Part "E" at left. Here two surfaces and two radii, including inside fillet, are being ground simultaneously.

I-T-E's experience with Panto-Crush Wheel Dressers was fully reported in "American Machinist." We'll gladly send you a reprint and our catalog.

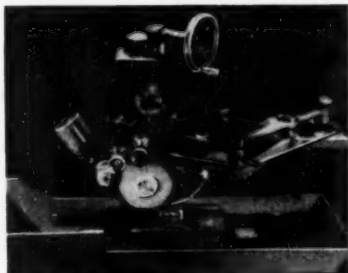
They've taken the "by-guess-and-by-gosh" out of the contour-grinding of toggle latches at I-T-E Circuit Breaker Company, Philadelphia, switchgear manufacturers. Moore Panto-Crush Wheel Dressers have solved the problem of accurate, interchangeable production of these moving mechanical parts so essential to faultless circuit breaker operation.

Irregular contours are now ground by wheels diamond-dressed to exact dimensions within .0002". Before installing Moores, I-T-E ground the contours by shifting the parts at different angles. Accuracy and field interchangeability suffered. Today both are completely satisfactory, and output itself is up 30%!

The Panto-Crush is mounted on the wheel spindle of a surface grinder. It is the only wheel dresser combining a precision-built pantograph for guiding the diamond from a template and a self-driven crush

former. You switch from one to the other without removing workpiece.

MOORE SPECIAL TOOL COMPANY, INC.
728 UNION AVENUE, BRIDGEPORT 7, CONN.



Moore Panto-Crush Wheel Dresser

ADD TO YOUR TOOLROOM

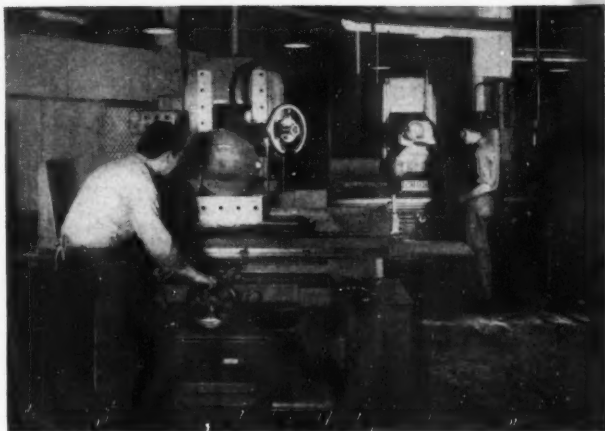
JIG BOXERS • JIG GRINDERS • PANTO-CRUSH WHEEL DRESSERS • DIE FLIPPERS • COMPLETE LINE OF HOLE LOCATION ACCESSORIES

When Writing Advertisers Please Mention MACHINE and TOOL BLUE BOOK

21

Enthusiastic Customers do our BEST advertising

The Rotor Tool Company, Cleveland, Ohio, uses a Model F Grand Rapids Hydraulic Feed Surface Grinder and a Model 55. They call their purchase of these machines an "excellent investment."



You will appreciate the micro-inch finish produced at production speeds on Grand Rapids Grinders. All Grand Rapids Hydraulic Feed Surface Grinders have these outstanding features:

1. One-piece column and base casting for vibrationless rigidity
2. Precision ball-bearing spindle which is greased for life
3. Bijur one-shot lubrication system eliminating hand oiling
4. Patented vertical movement of wheel head for quick, accurate adjustments
5. Portable coolant tank for ease of coolant replacement
6. Vane type hydraulic pump for fast longitudinal table travel

to serve you—

Your inquiry concerning your specific grinding needs will receive prompt attention. Grand Rapids Grinders include: Hydraulic Feed Surface Grinders, Universal Cutter and Tool Grinders, Hand Feed Surface Grinders, Drill Grinders, Tap Grinders, and Combination Tap and Drill Grinders.

**GALLMEYER &
LIVINGSTON
COMPANY**

405 Straight, S. W., Grand Rapids 4, Mich.

GRAND RAPIDS GRINDERS

Rake Angle is just as important in a Tap as it is in a Lathe Tool

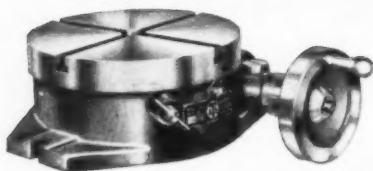
*Write for Bulletin 46 6-A
on the Blake Flute Grinder and find out
how to control
Rake Angle on your own taps*



437 Cherry Street, West Newton 65, Mass.

Black Diamond Precision Drill Grinders . . . Blake Tap
Grinders . . . Blake Flute Grinders . . . Waltham Cutter
Sharpeners . . . Waltham Thread Milling Machines . . .
American Tool Holders . . . Surface Finish Standards

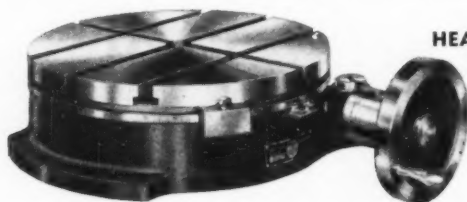
TROYKE ROTARY TABLES



STANDARD MODELS WORM WHEEL OPERATED ROTARY TABLES

Five sizes: 9", 12", 15", 18", 21".

For Die Sinking, Jig Boring, Cam Milling. Indispensable in wood and metal pattern shops.



HEAVY DUTY MODELS WORM WHEEL OPERATED ROTARY TABLES

Three sizes: 18", 21", 25".

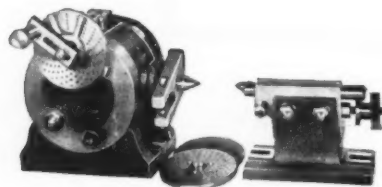
These larger, heavy duty models are used for Jig Work, Planer Jobs, and on Horizontal Boring Mills.



STATION INDEXING BALL BEARING ROTARY TABLES

Three sizes: 12", 15", 18".

These models are used for drilling and milling operations when quick and positive station indexing is required.



CARROLL DIVIDING HEADS

The illustration shows only one model of a complete line of Dividing Heads, and Spiral Driven Heads, consisting of twelve models, built in.

Three sizes: 6", 10", 12".

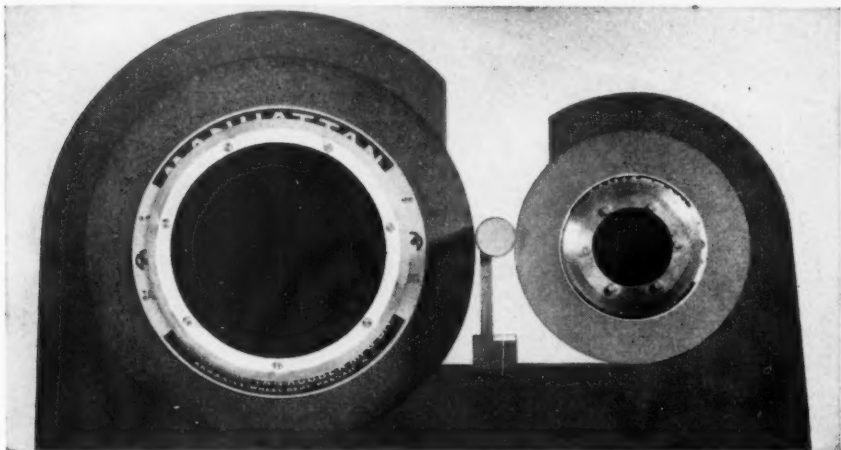
QUALITY PRODUCTS AT THE LOWEST PRICES



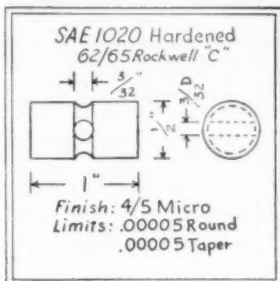
TROYKE MFG. CO., INC., CINCINNATI 9, O.

See your dealer or write us for complete catalogs.

Performance Proves the Quality of **MANHATTAN RUBBER BONDED CENTERLESS WHEELS**



ROUGH AND FINISH with SAME WHEEL



Regulating Wheels — Plain — Core Mounted — Manhattan Core Mountings Effect Substantial Savings

Example #1: Roughing and Finishing 1/2" dia. x 1" long SAE 1020 Pins (Soft and Hard)

Performance of 20x6x12—4660 Q64 KLE Wheels
Rough soft—2 passes .005/.006 each—hold tolerance to .0002
Rate of feed 70 pieces/min.—Grinding wheel speed 1200 RPM
Pins hardened at this point to 62/65 Rockwell "C"
Finishing hardened—Filmatic Bearing Machine—wheel speed 1600 RPM
3 passes .001/pass for sizing and rounding up
Final pass .0015—3 to 4 micro finish—hold tolerance—.000025

Example #2: Roughing and Finishing Miscellaneous Materials

Performance of 20x6x12—80100 Q52 BV5 Wheels at 1200 RPM. On all these jobs wheels held good size with infrequent dressings:
5/8" dia. x 12" long SAE 1020 Soft Rod
3 passes—.008, .004 and .001 to 4 or 5 micro finish
1/2" dia. x 5/8" long Hardened Steel Bushing
Infeed—.008 removal—very good finish and size
1/4" dia. x 8" long—Stainless Steel Bars
2 passes—.010/.012 and .002/.003 to excellent finish



RAYBESTOS-MANHATTAN INC.

Keep Ahead with Manhattan

MANHATTAN RUBBER DIVISION

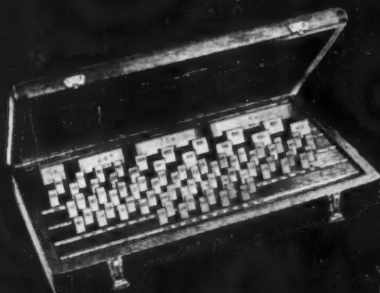
PASSAIC, NEW JERSEY

When Writing Advertisers Please Mention MACHINE and TOOL BLUE BOOK

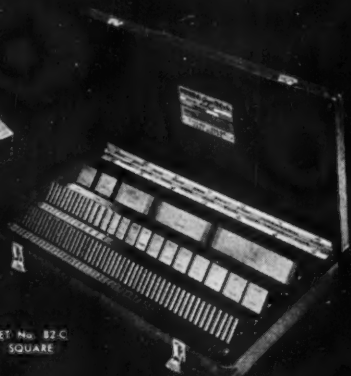
25

ONLY FONDA MAKES COMPLETE SETS OF Lifetime - Carbide GAGE BLOCKS

... in the full range of sizes



SET No. 82-C
RECTANGULAR



SET No. 82-C
SQUARE

OUTLASTS ORDINARY STEEL GAGE BLOCKS

by 139 to 1

- ▶ Surface finish 0.15 to 0.3 micro inch rms. Almost absolute perfection.
- ▶ Superior wringing qualities — wring best when dry and clean, assuring greatest accuracy.
- ▶ Retains original accuracy and Surface Finish.
- ▶ Will not rust or corrode.
- ▶ Guaranteed against breakage.

Write for
REPLACEMENT PLAN
AND FREE CATALOG
46-1



FONDA

GAGE COMPANY
STAMFORD • CONNECTICUT

A recent analysis, made by one of the largest manufacturers of Office Machine Equipment, using a total of 260 sets of steel gage blocks, indicated that the cost of their gage blocks including a rigid inspection and replacement program amounted to \$466,000 during a ten year period.

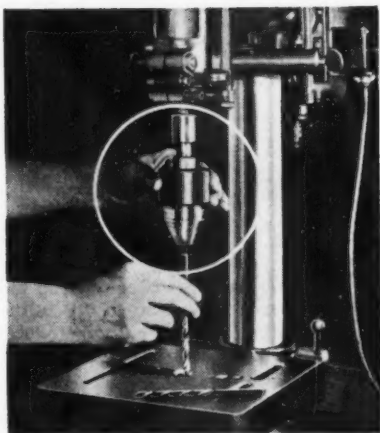
Replacement of these steel blocks with *Fonda Lifetime Carbide* will result in a saving of \$538,000 over a period of only twenty years.

Our representative would be pleased to assist you in analyzing your steel gage block cost and point out the savings made possible by replacing steel with *Fonda Lifetime Carbide Gage Blocks*.

also... FONDA "ultra-finish" STEEL GAGE BLOCKS

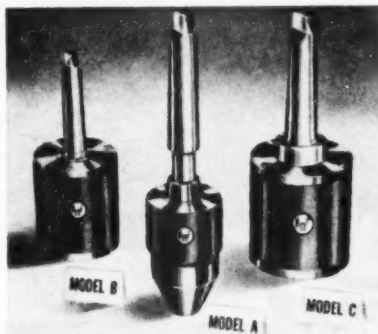
... complete sets and individual sizes ... standard inch and metric measurements ... maximum accuracy, longer wear, finer finish and superior wringing qualities make FONDA Steel Gage Blocks superior to all others.

Change drills in a second, safely with this Automatic Chuck while spindle is running



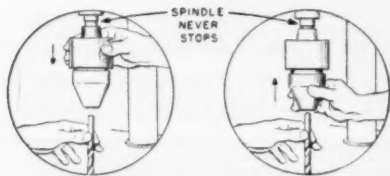
AMF Wahlstrom Chucks are rugged tools, proven out in many years of heavy production work. Simple construction assures ease of operation.

THESE WAHLSTROM TOOLS CUT COSTS, TOO



Wahlstrom Chucks are available in several size ranges:
Model A—1/32" to 1/2"; Model AA—1/64" to 3/8".
Model B—15/64" to 1/2"; 3/8" to 3/4"; 17/32" to 1".
Model C—Holds any size tool with No. 1, 2, or 3 M. T. Shank.

HERE'S ALL THERE IS TO CHANGING DRILLS



1. Grip sleeve—pull down
—jaws open automatically
—drill is released.

2. Insert new drill—push
up tapered part—drill is
locked in place.

You don't stop the machine to change drills with the AMF WAHLSTROM CHUCK. No keys, collets or wrenches are needed.

That's why Wahlstrom Chucks cut costly minutes in changing tools for drill press work or for spotting, drilling and reaming in boring or milling machines. They'll also save money in lathe work for burring, turning, filing, etc. *One spindle does the work of several.*

Tools last longer, too...smooth, hardened and ground jaws grip tight without chewing into tools. Grip increases with the load.

For fast, uninterrupted production, use the quick-change AMF WAHLSTROM CHUCK. It is the only fully automatic drill chuck which holds the widest range of straight shank tools...Model A—1/32" to 1/2" ; Model AA—1/64" to 3/8".

**See your local distributor or write today
for Bulletin 56-4**

WAHLSTROM TOOL DIVISION, AMERICAN MACHINE & FOUNDRY CO.
5502 SECOND AVENUE BROOKLYN 20, N. Y.

WAHLSTROM
fully automatic
DRILL CHUCKS

NO KEYS, COLLETS OR WRENCHES



Bond

STOCK GEARS

SPROCKETS

SPEED REDUCERS

FLEXIBLE COUPLINGS

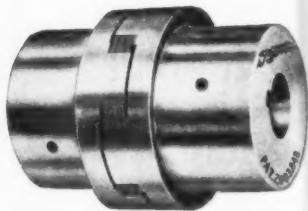
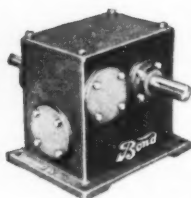
TRUCKS, CASTERS, ETC.

INDUSTRIAL EQUIPMENT

For over 60 years we have been serving the trade with products of highest quality in design and manufacture; users of our products are assured this policy will be continued.

Our Coast-to-Coast Distributors in leading industrial centers carry large stocks of BOND Gears, Sprockets, Speed Reducers, and Industrial Equipment for your convenience.

If there is not a BOND Distributor in your City, inquiries to our main office will be answered promptly.



CHARLES

Bond

COMPANY

617 Arch St., Philadelphia, Pa.

Mall Rolling GRINDER

REG. U.S. PAT. OFF.

Cuts Material Handling Costs



Extra loading, hauling, unloading, wear and tear on a product moving it to a stationary grinder are eliminated when you roll a Mall Flexible Shaft Grinder up to the work.

Because the motor is not carried by the worker, but is mounted on the easy-roll stand, a larger, more powerful motor containing more iron and copper can be used to safeguard against overloading and "burn-outs". The light weight working tool is more comfortable, easier to hold and handle than one with the motor built in.

Thus, larger areas can be covered faster, with less effort. The several attachments for Grinding, Sanding, Wire Brushing and Polishing can be changed in a jiffy.

This tool will pay for itself in your plant before you realize it. Let us prove this to you at our expense. Write at once for FREE Demonstration Offer, literature, prices and name of nearest dealer. Address Flexible Shaft Division

Direct Drive, Geared Head and Counter Shaft Models $\frac{3}{4}$ H.P. to 3 H.P.

MALL TOOL COMPANY

7742 South Chicago Avenue

Chicago 19, Illinois

Established 1921

NEW MADISON Grinding Fixture gives you precision tool grinding at a NEW low price

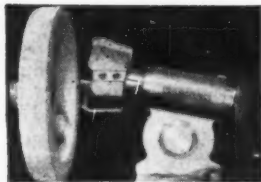


Only \$75.00 for this ruggedly built, soundly designed grinding fixture that handles the many tool grinding jobs with speed and precision. Now even the smallest shop can own one . . . and large shops can have several and avoid any delay in tool sharpening. Although the low price has been made possible by eliminating the expensive adjustments which are so rarely used, in actual practice the scope of this fixture is limited only by ability of the toolman to work out a setup.

The Madison fixture is graduated in all three planes and offers 180° automatic indexing for resharpening Madison cutters and which can be released for conventional handling of other types of tools.

\$75.00

less arbors



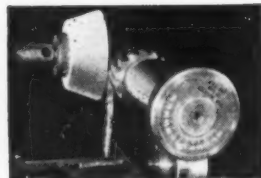
Regrinding face mill.



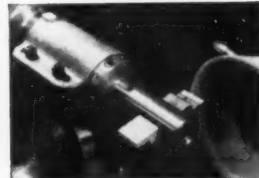
Grinding trailing angle and relief on tool bit.



Regrinding face of end mill.



Resharpening spiral milling cutter.



Regrinding relief angle on Madison reaming cutter.



Grinding lead angle on Madison roughing cutter.

ARBORS FOR MADISON FIXTURE are available for Jacobs chuck, for milling cutters, and for single bit tools, as well as the complete range of arbors for Madison tools, at \$12 each. If needed special arbors will be designed and built by Madison. Quotations upon request.

WRITE FOR this NEW color bulletin which describes the Madison fixture in detail.



MADISON MANUFACTURING COMPANY
DEPT. BB MUSKOGON, MICHIGAN

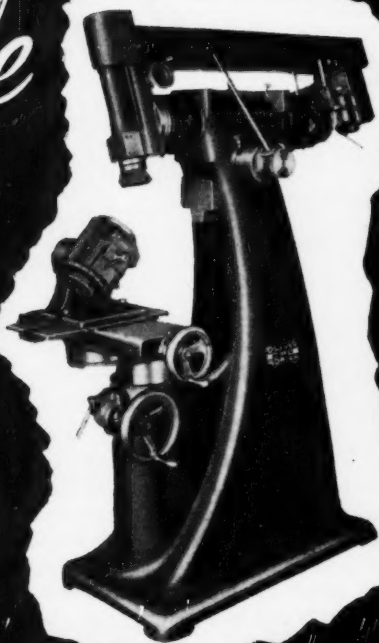
Versatile

The OLIVER ACE Cutter Grinder

OLIVER
OF
ADRIAN

NO STOOP-
NO SQUAT-
NO SQUINT!

A Pleasure
to Operate



There is no more versatile cutter grinder on the market today than the Oliver ACE. The range of cutting tools accommodated by this machine with a minimum of extra fixtures is unparalleled—face mills up to 15" diameter, end mills, side mills, hobs, reamers, spot facers, slitting saws, counterbores, double angle cutters, helical gear cutters, staggered tooth cutters, chip breakers, taps, flat broaches, slab mills, and many more.

The Heavy Duty Model shown above was designed especially for the sharpening of Tungsten-Carbide, Stellite, and other hard metal cutting tools. It is easy to set up—simple to operate.

IMPROVE YOUR TOOLROOM
IT'S THE BACKBONE
OF PRODUCTION

OLIVER INSTRUMENT CO.
1408 E. Maumee St., Adrian, Michigan



AUTOMATIC DRILL GRINDERS
TOOL & CUTTER GRINDERS—DRILL
POINT THINNERS—TEMPLATE
TOOL GRINDERS—FACE MILL
GRINDERS—DIEMAKING MACHINES

**Send for
Literature**

Let's talk shop—

Here's what I
hear from the
boys who know
Firth Sterling
high speed
toolholder bits—



They go for **CIRCLE C** in a big way! It's the top quality tool bit steel! *But its cost is negligible.* By increasing production even 5%—the resulting man and machine earnings completely eliminate the tool bit cost. And, it cuts materials many other high speed steels can't touch. You can't beat **CIRCLE C**.

There may be applications in your shop where Firth Sterling **BLUE CHIP** (an 18-4-1 machining stand-by for many years) will do the work most economically and satisfactorily and where the top quality Circle C is not required. Or, if you want a still more moderately priced general purpose bit, Firth Sterling **STAR-MO M-2** can fill the bill.

Whichever grade you require—if it's Firth Sterling, it's the best for your job.

Bulletin SL-2028 gives you the details on all Firth Sterling High Speed Toolholder Bits—write today for a copy.

Better yet, call your nearest Firth Sterling office for a Representative who can help you choose the right high speed toolholder bit for your particular job.



Firth Sterling

STEEL & CARBIDE CORPORATION

McKEESPORT, PA.

Offices and Warehouses in Hartford, Philadelphia, Cleveland, Detroit, Chicago, Dayton and Los Angeles. Offices in New York and Pittsburgh.

Distributors: Carey Machinery & Supply Company, Baltimore—York Machinery & Supply Company, York, Pa.—Tanner and Company, Indianapolis—Wm. S. Bolden Co., Charleston—Huge-Fayle Company, Houston

In Canada: Chapat Engineering & Sales, Ltd., Hamilton, Ontario



August Ries, foreman of Victor Electric's rotor production, shown removing a "gate" of four rotors from the Model 400 Cleveland.

Here's how to get relief from hot competition!



The rotors shown being cast above are used in 1/20 h.p. induction motors that power this 3-speed, 16" "Victor" Heavy Duty Oscillating Fan—one of the many fine electric ventilating, heating and appliance products designed and built by Victor Electric Products Inc. One of the "as-cast" rotors is shown below.



Victor Electric Products Inc. builds a better motor, faster, at less cost, with the help of **CLEVELAND** Die Casting Machines...

By die casting rotors for fractional h.p. motors on Cleveland Die Casting Machines, Victor Electric Products Inc., Cincinnati, have by-passed many costly steps in their motor fabricating line; have increased production more than 300%; are able to maintain the *uniform* excellence of product construction that is Victor Electric's stock-in-trade.

With their two Model 400 Cleverlands, Victor Electric makes rotor production a breeze. Stamped rotor laminations are weighed, stacked, pressed on splined shafts and inserted in a four-cavity die in the Cleveland machine. 99.5% pure aluminum is injected into the die and through the lamination

perforations to form the rotor conductor bars and end rings.

Production averages 55 perfect shots per hour. Only 25% of the total output require corrective drilling to be in dynamic balance! The Cleveland-cast rotor is high in conductivity; has minimum porosity; is indestructible in operation. Considerable time is saved; metal and labor costs are way down; a better product results.

Are you considering new die casting machinery—or changing to die casting? If so, why don't you profit from the experience of many manufacturers and consider Cleverlands first? For machine specifications, write now for bulletins.

THE CLEVELAND AUTOMATIC MACHINE COMPANY

**4934 Beech Street
Cincinnati 12, Ohio**

SALES OFFICES: CHICAGO
CLEVELAND • DETROIT
HARTFORD • NEWARK

Manufacturers of a Complete Line of Single Spindle Automatic Screw Machines and High Pressure Hydraulic Die Casting Machines

When Writing Advertisers Please Mention MACHINE and TOOL BLUE BOOK



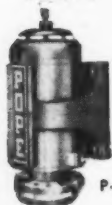
P-5781-2



P-2461



P-32T



P-2500



P-1461



P-2463



P-1932



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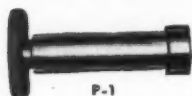
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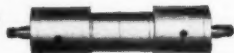
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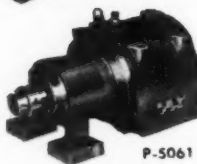
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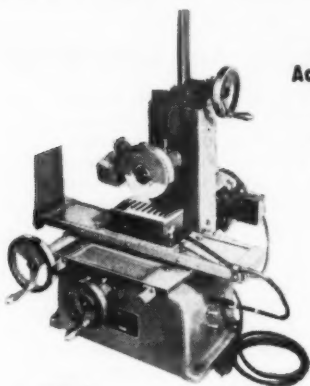
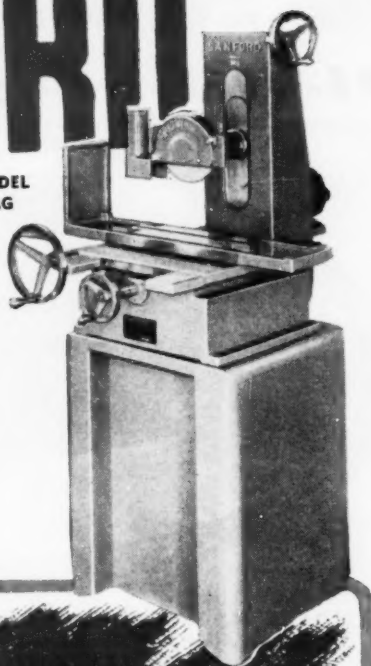
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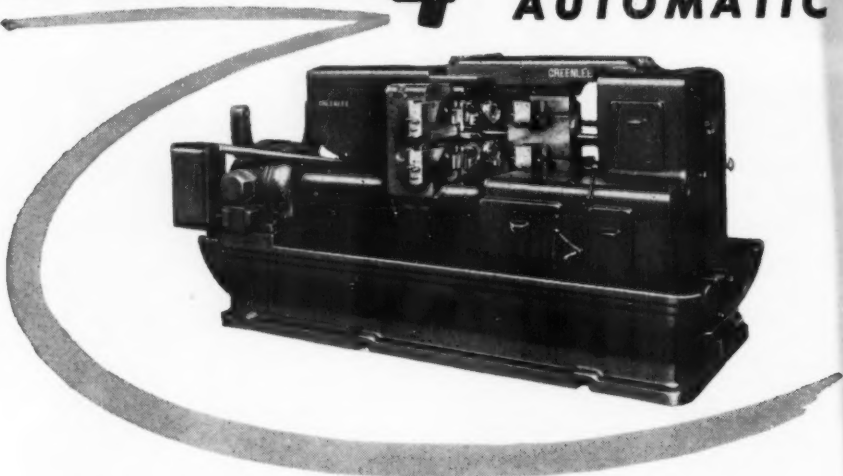
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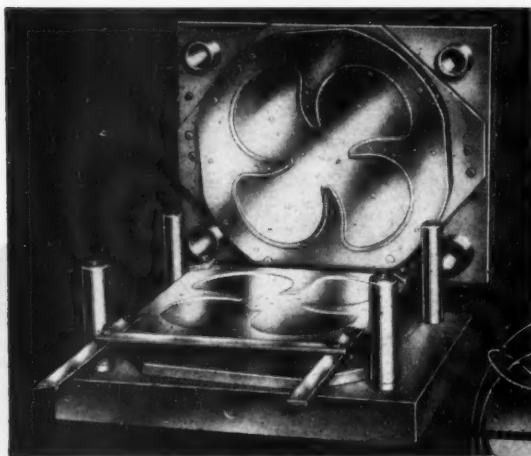
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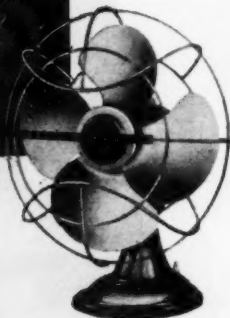


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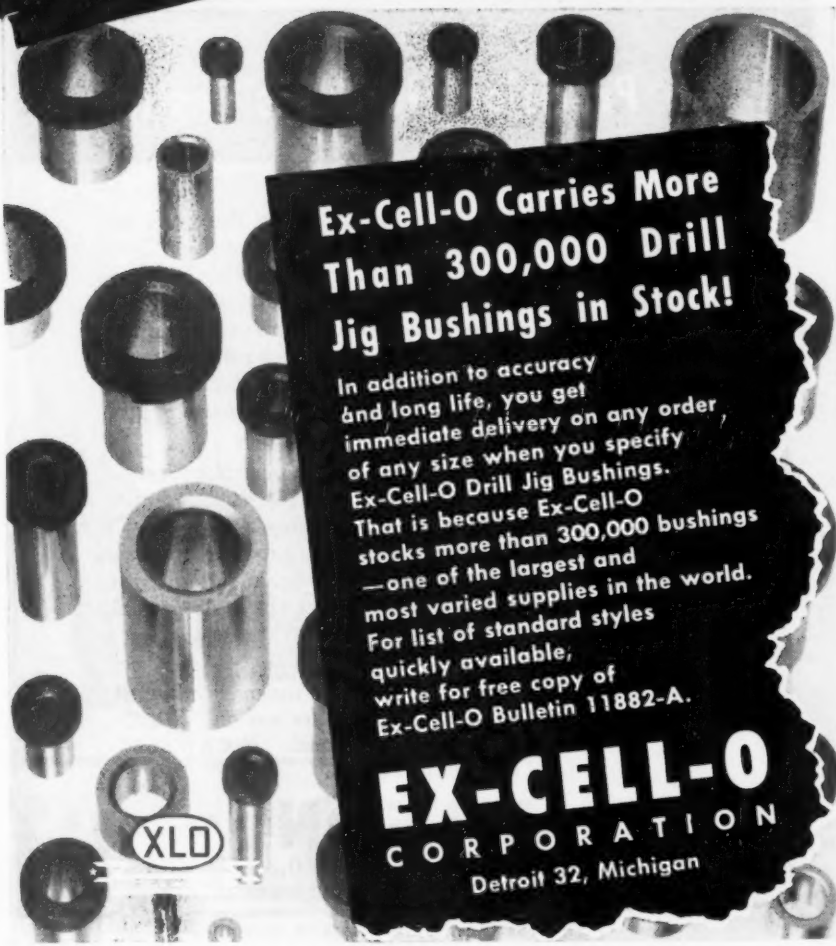
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We are originators and exclusive manufacturers of "ROCKWELL" Hardness Testers, "ROCKWELL" Superficial and TUKON Microhardness Testers. Our years of concentration on developing and improving hardness testing equipment give our factory-trained representatives the necessary background for the best possible service to you.



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MACHINE and TOOL BLUE BOOK

June, 1949

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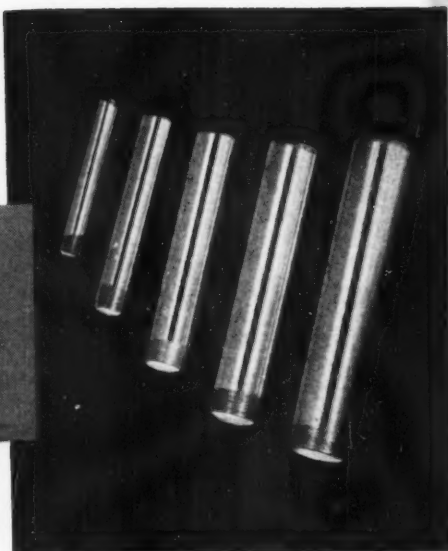
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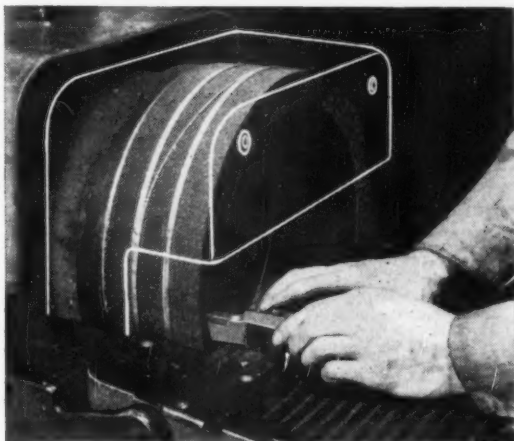
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GRINDING WHEELS FOR CARBIDE TOOLS

LIGHTER FEED... COOLER CUTTING



THE BUXITE PROCESS

(Formerly Controlled by The Bridgeport Safety Emery Wheel Co., Inc.)

The Buxite Process is a revolutionary method of coating each individual grain of Buxite wheels with a microscopically thin shell of carbon in an isotropic vitrescent form. Each shell permits its grain of abrasive to turn, exposing every cutting surface before it is worn away. Each succeeding layer of grains are contained in their individual carbon shells, assuring constant grinding action during the life of the wheel.

REPRESENTATIVES NOTE: There are a few desirable territories available to well qualified representatives. If you are interested, write us, giving full particulars of your operation and qualifications.

Buxite grinding wheels perform better and actually cut faster with light pressure. This means that carbides and other superhard steels can be ground with less heat being generated... which prevents checking and cracking, lengthening the life of the tools.

GRIND CARBIDE TOOLS AT 75% TO 85% LESS COST

Not only do Buxite wheels increase carbide tool life, but they give a cleaner grind and better finish. Buxite wheels do not "load" when grinding sintered tools, eliminating frequent stops for dressing, and the hard-shelled grains makes the life of each Buxite wheel 4 to 6 times that of ordinary wheels.

REDUCE DIAMOND WHEEL CONSUMPTION

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ADDITIONAL ADVANTAGES OF BUXITE WHEELS

Every feature of Buxite wheels contributes to faster production and lower piece cost on grinding operations involving super-hard tool steels. Faster, cooler cutting action, longer tool life, longer wheel life and reduction or elimination of diamond wheel consumption result in greatly lowered costs. If our representative has not called recently, write direct to us for additional information and money-saving facts.

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BORING • DRILLING

The new Index Angle-Milling Head accurately handles horizontal milling operations of every type including boring and drilling. Change over from vertical to angle milling takes only a few seconds and is done without disturbing the work on the machine table. The attachment can also be used as a cutting arbor or tool holder.



- Automatic Spindle and Table Feed.
- Table Size - 8 x 34".
- Twelve variable cutter speeds up to 2450 rpm.
- Three table speeds can be varied indefinitely.

The Model 50 Index Milling Machine offers a greatly increased range of working capacity over any machine of comparable size or cost, plus a substantial saving on production time and labor. The sound engineering and solid construction of the machine make an extremely rigid unit without deflection or chatter to throw off the accuracy of the work.

A quick change full-g geared table feed mechanism delivers power to the table through a spined feed shaft. The Key Way of the Lead Screw is eliminated, further adding to the machines great precision and sensitive operation. Hand finishing of work is reduced to a minimum.

Other features of the Index Milling Machine include precision ground Lead Screws, large, easy-to-read Angle Dials, Automatic Controls throughout and a full line of accessories.

Send Today for the NEW INDEX CATALOG

INDEX MACHINE CO.

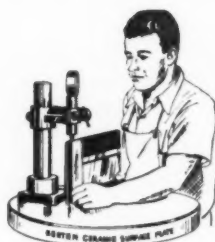
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The Norton CERAMIC Surface Plate



NORTON COMPANY
Worcester 6, Massachusetts

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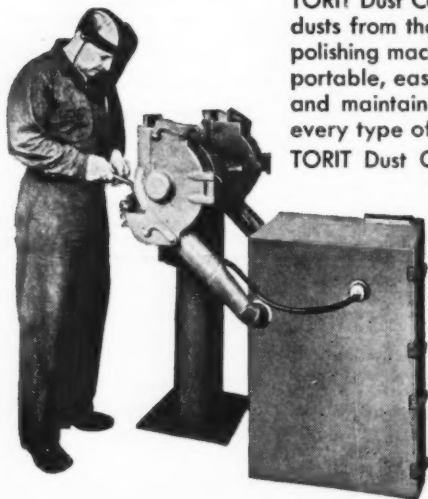
CERAMIC SURFACE PLATES

- 1 **Extremely long life** is assured for these wear-resistant plates which are made of one of the hardest substances known.
- 2 **Flat within .0001"** is the guarantee for these ceramic surface plates—an important quality in precision measuring.
- 3 **Permanent flatness** is a feature of these ceramic surface plates that will not warp or deform, give expansion troubles or deflect under load.
- 4 **Smooth surface** allows easy movement of instruments and work across plate without drag or vibration but with correct "pull" for accurate measuring by operator.
- 5 **Non-magnetic** nature of this ceramic surface plate permits work to be removed from magnetic chuck and checked without necessity of demagnetizing.
- 6 **Non-corrosiveness** is another feature of Norton ceramic surface plates which are impervious to any atmospheric condition and do not require protection from moisture.
- 7 **Ideal for bluing** is the special surface texture of these plates. A uniform film is readily transferred from the plate to the work.
- 8 **Faster, more accurate readings** are possible because of the precise flatness and extreme smoothness of these ceramic surface plates.
- 9 **Prevents wear** of expensive instrument bases, gage blocks and sine bars because of the flat, smooth surface of these ceramic surface plates.
- 10 **Easily cleaned** with any soap powder and water—and periodic cleaning is recommended.

Write for Free Bulletin No. 1174



Why waste time dusting when you can
eliminate abrasive dusts with
TORIT DUST COLLECTORS



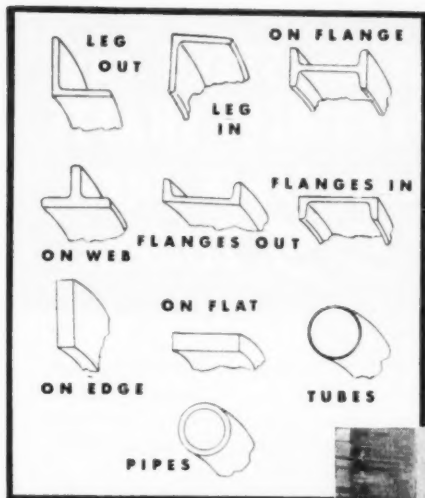
TORIT Dust Collectors completely filter abrasive dusts from the air around grinding, cut-off and polishing machines. They are self-contained and portable, easy to install, and simple to operate and maintain. Over 15,000 are now in use in every type of industry.

TORIT Dust Collectors improve working conditions and protect valuable machinery. Made in sizes and models to fit all standard machines, they are very economical to own and operate. For complete details and the latest TORIT catalog write:

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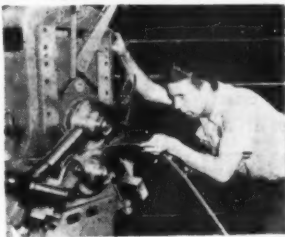
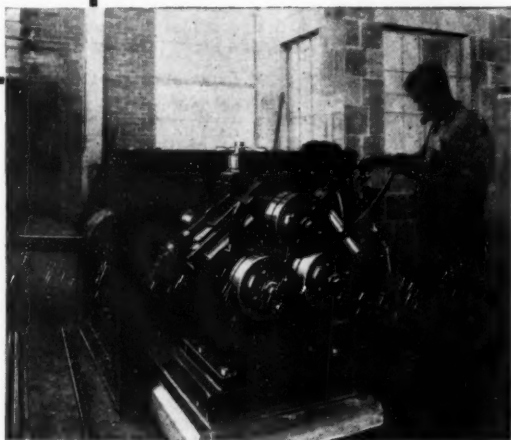


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**TO BEND THESE
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**"Buffalo" BENDING
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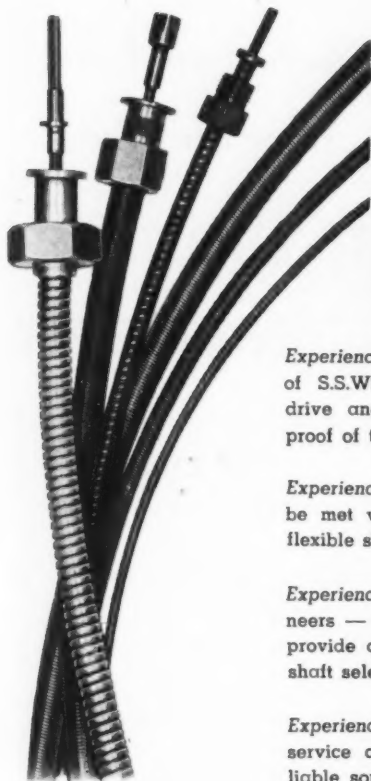
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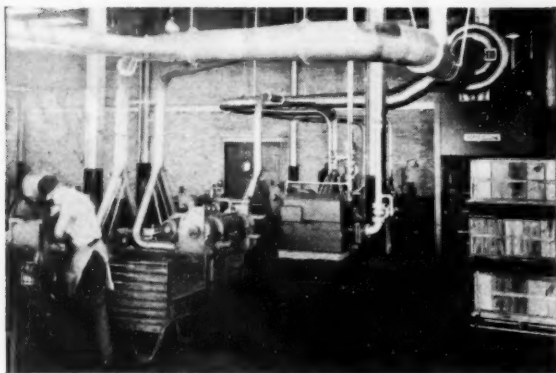
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gives dust a one-way ticket

DUST can't linger here to cloud the atmosphere, foul up equipment and irritate workers. The moment it is generated, it's on its way out via Roto-Clone*.

This battery of stand grinders used for snagging castings is served by two Type D Roto-Clones installed back to back. Note the compactness of the installation. Location of the Roto-Clones at dust source eliminates long, costly pipe runs.

Constant efficiency, uniform air volume, small space requirement, low cost and ease of installation—these are the features of the Type D Roto-Clones that have made this unit a leader in the industry's winning battle over dust.

A Type D Roto-Clone Dust Control

System may be installed as a central type with main duct and branch connections (as pictured), or as an individual unit serving a single dust-producing operation. For complete information, call your local AAF representative or write direct to address below.

IT'S A FACT! More grinders are exhausted by the Type D Roto-Clone than any other type of dust collector. Bulletin No. 272A tells the story. Write for it now!



**Roto-Clone is the trade-mark (Reg. U. S. Pat. Off.) of the American Air Filter Company, Inc., for various dust collectors of the dynamic precipitator and hydrostatic precipitator types.*

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ROTO-CLONE®
DUST CONTROL EQUIPMENT

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High speed under load . . . Rotor 360 Cycle Tools slow down only about 5% under full load, compared to 20% for pneumatic tools and 45% for universal tools.

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Write for a free copy of Bulletin 36 describing this new Rotor line of grinders, sanders, buffers and polishers.

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THE **ROTOR TOOL** CO.

CLEVELAND, OHIO

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Write for catalog of Challenge Surface Plate Equipment Today!

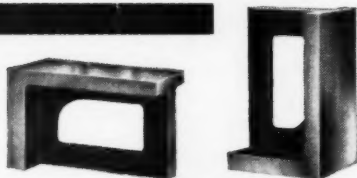
We reshape and regrind surface and layout plates. Write for details of this service.

The Challenge Machinery Co.

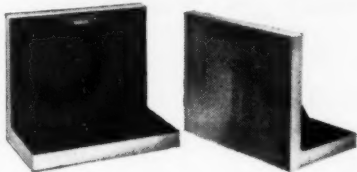
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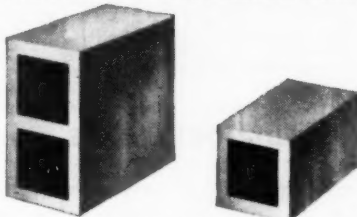
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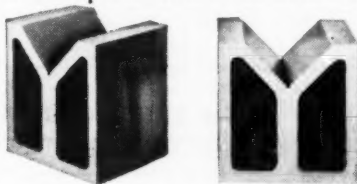
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Cut set-up time to a minimum ★
Increase output ★ Reduce costs



PATENTED HOLDER

Exclusive dual clamping arrangement permits independent adjustment of bar or alignment of holder—either may be made without disturbing the other. Holder will accommodate all fractional sizes of Bars (within its minimum and maximum capacities) without use of sleeves or bushings.

COMPLETE SETS (Holder and Three Bars)

Set No.	Diameter Bar Inches	Tool Bit Inches Squares	For Lathe Swing Approx.	Price Complete
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1-A	$\frac{1}{2}$, $\frac{3}{4}$, $1\frac{1}{2}$	$\frac{1}{8}$, $\frac{1}{4}$, $\frac{3}{8}$	12" to 16"	26.35
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* $\frac{3}{8}$ " diameter bar included in set is solid tool steel.

INDIVIDUAL BARS (Calibrated)

Bar No.	Dia.	Length	Tool Bit	Price	Bar No.	Dia.	Length	Tool Bit	Price
162A	$\frac{3}{8}$ "	7"	$\frac{1}{8}$	\$3.50	127A	1"	14"	$\frac{1}{8}$	\$6.30
122A	$\frac{1}{2}$ "	8"	$\frac{1}{8}$	3.50	128A	$1\frac{1}{8}$ "	16"	$\frac{3}{8}$	8.75
123A	$\frac{3}{4}$ "	9"	$\frac{1}{8}$	3.50	129A	$1\frac{1}{4}$ "	18"	$\frac{3}{8}$	12.30
124A	$\frac{3}{4}$ "	10"	$\frac{1}{8}$	3.50	130A	$1\frac{1}{2}$ "	23"	$\frac{1}{2}$	16.38
125A	$\frac{3}{4}$ "	11"	$\frac{1}{4}$	4.35	176A	$1\frac{7}{8}$ "	30"	$\frac{3}{4}$	36.35
126A	$1\frac{1}{8}$ "	13"	$\frac{1}{8}$	6.30	155A	$2\frac{1}{2}$ "	36"	$\frac{3}{4}$	72.70

CALIBRATED CHATTER-PROOF BORING BARS

- ★ Graduated in quarter inch calibrations to speed production.
 - ★ Made from special tough non-chattering steel.
 - ★ Tool bit hole broached in each end—one at 90°, other at 45°. ($1\frac{1}{8}$ " and $2\frac{1}{2}$ " Bars have one hole at 90° and other at 30°.)
- When ordering give make and swing of lathe.

IMMEDIATE DELIVERY

Write for information on
GLOBE Grinders—Buffers
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DISTRIBUTED BY BETTER
DEALERS EVERYWHERE

HIGH SPEED CUTTER BITS—PRICE EACH

$\frac{1}{8}$ x18	$\frac{1}{8}$ x2 $\frac{1}{2}$	$\frac{1}{8}$ x18	$\frac{1}{8}$ x1 $\frac{1}{4}$	$\frac{1}{8}$ x2 $\frac{1}{2}$	$\frac{1}{8}$ x1 $\frac{1}{4}$	$\frac{1}{8}$ x2 $\frac{1}{2}$	$\frac{1}{8}$ x1 $\frac{1}{4}$	$\frac{1}{8}$ x2 $\frac{1}{2}$	$\frac{1}{8}$ x1 $\frac{1}{2}$	$\frac{1}{8}$ x3	$\frac{1}{8}$ x2	$\frac{1}{8}$ x4	$\frac{1}{8}$ x2 $\frac{1}{4}$	$\frac{1}{8}$ x4 $\frac{1}{2}$	$\frac{1}{8}$ x2 $\frac{1}{2}$	$\frac{1}{8}$ x5
.20	.30	.20	.25	.30	.25	.35	.30	.45	.40	.75	.85	1.35	1.25	2.25	2.15	3.10

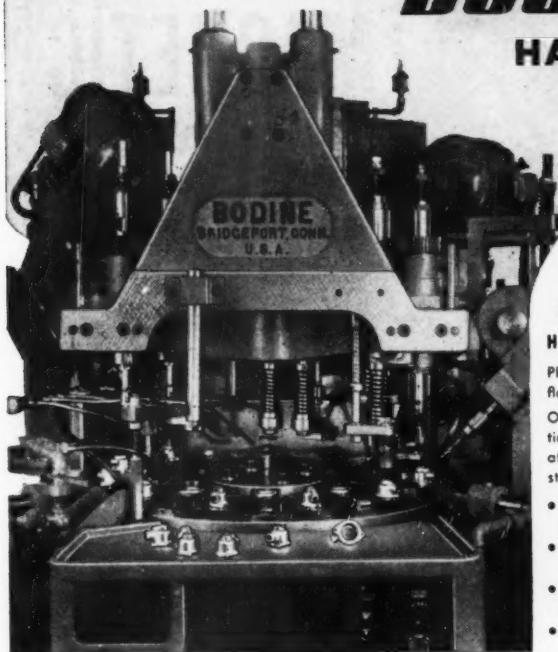
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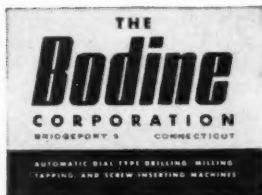


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Ask Bodine engineers to adapt one
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4BD48



HERE'S HOW COSTS GO DOWN

PRODUCT: 2 end pieces of brass cast float valve body.

OPERATIONS: Dial has alternate stations, operator loads one fresh casting at each stroke, transfers one piece from station to next one, opposite end up.

- Part automatically clamped by air cylinder.
- Combination tool faces part over 2 1/4" dia.
- Drill, countersink 2 #25 holes thru 1/4" thick ears (combination tool).
- Tap both holes 10-24, completing first pass under spindles. Part turned, located from finished face and 2 ear holes.
- Core drill and face the hole for 1/4" pipe tap.
- Tap 1/4" pipe thread.
- Core drill and face 7/16" dia. hole at right angles to axis (combination tool, horizontal spindle).
- Drill, counterbore 1/4" dia. hole, 45° from axis.
- Tap above hole (angularly mounted drilling and tapping spindles).

PRODUCTION: By changing dial fixtures both ends of body are produced on this Bodine 42-30 machine ... 15 complete components per minute.

GUARANTEED WATERPROOF
FOR WET OR DRY GRINDING
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MAXIMUM HOLDING POWER
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LONG LIFE CONSTRUCTION
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FOR OPERATION ON
110 OR 220-VOLT D.C.

L-W MAGNETIC CHUCKS

5 1/4" x 13"
\$47.65
6 1/2" x 18"
\$63.15
8" x 24"
\$109.30
10 1/4" x 37"
\$202.05



DEMAGNETIZERS

A single pass over the stationary poles is sufficient to completely demagnetize work that has become magnetized through induction. Model B-2 for large work, complete with pilot light signal, switch and cord. Operates on 110 volts A. C. current. 7 1/2" wide, 12 1/2" long, 6 1/4" high. Shipping weight 55 lbs. **\$63.20**

Model J-1 for small work, complete with switch and cord. 7 1/4" wide, 7 1/4" long, 6 1/4" high. Shipping weight 35 lbs. **\$41.15**



DEMAGNETIZING SWITCHES

For use on our 5 1/4" x 13" and 6 1/2" x 18" sizes. When the switch is thrown to "ON" position, the chuck is magnetized, and the work held firmly for grinding. When the work is to be released, the switch is thrown to "DEMO" and contacts are touched momentarily to neutralize the chuck. **\$8.90**

Field discharge type for 8" x 24" and 10 1/4" x 37" **\$16.25**

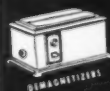


RECTIFIERS

For converting A.C. into D.C. for use on magnetic chucks. A.C. input 110 volts. D.C. output 110 volts. For continuous duty and long life. P-1 for 5 1/4" x 13" chuck 0.8 amps., **\$38.75**. P-2 for 6 1/2" x 18" chuck 1.0 amps., **\$45.00**. P-3 for 8" x 24" 10 1/4" x 37" chuck 3.0 amps. **\$66.90**.



Send for complete catalog giving prices and specifications on these quality, low-cost L-W Products



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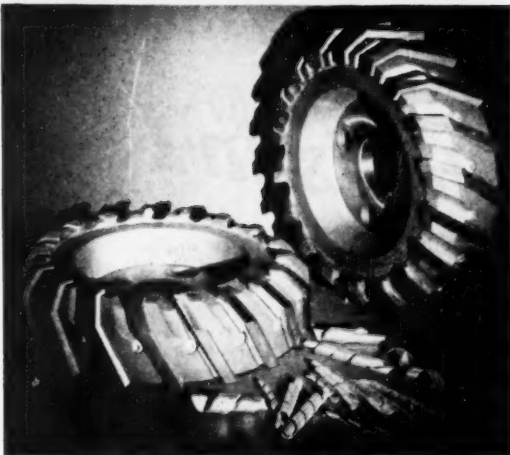
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WE CAN PROVE THAT: The Ingersoll patented *Shear Clear* face mill will outperform all other cutters. It is not "just another milling cutter", but a special tool. There is not just one *Shear Clear* but several different types. Each is developed for a specific application, using variations in cutting angles, blade materials and grades of carbide. The combination of cutting with a bevel using apparent steep positive axial



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May we have an engineer call and recommend the proper *Shear Clear* for your shop so you too can profit from the ultimate in faster milling?



Shear Clear with carbide tipped blades milling cast iron cylinder block at 45° per minute feed, \$75 ft. min., removing 1.8-3.16" stock.

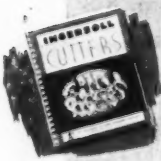


Note how Shear Clear chip is forced to curl and clear the blade away from finished surface and is thrown clear of cutter at end of cut. This action produces smoother finish, faster feeds, longer tool life, and less power requirements.



Milling SAE 9330 test block with 10" diameter Carbide Tipped Shear Clear, 1/2" stock, 8" wide cut, 300 ft. min. 16" feed, 105 horsepower.

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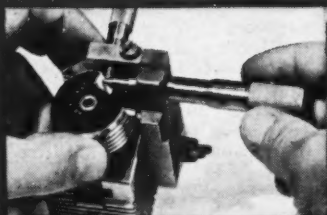
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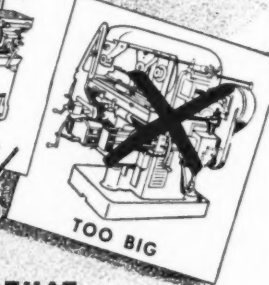
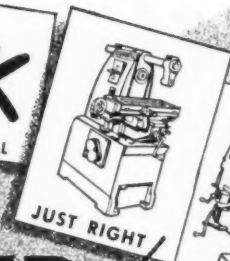
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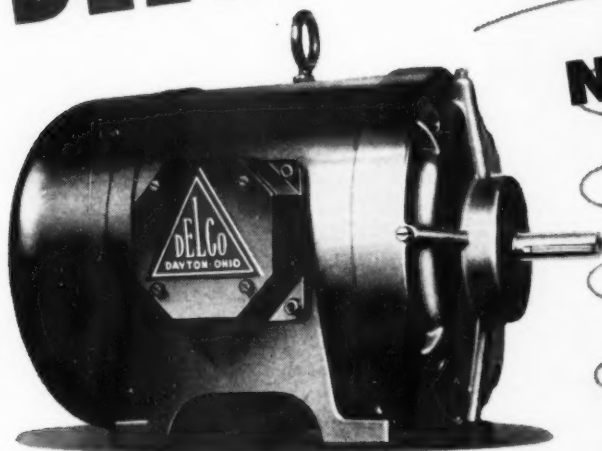
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DELCO MOTORS

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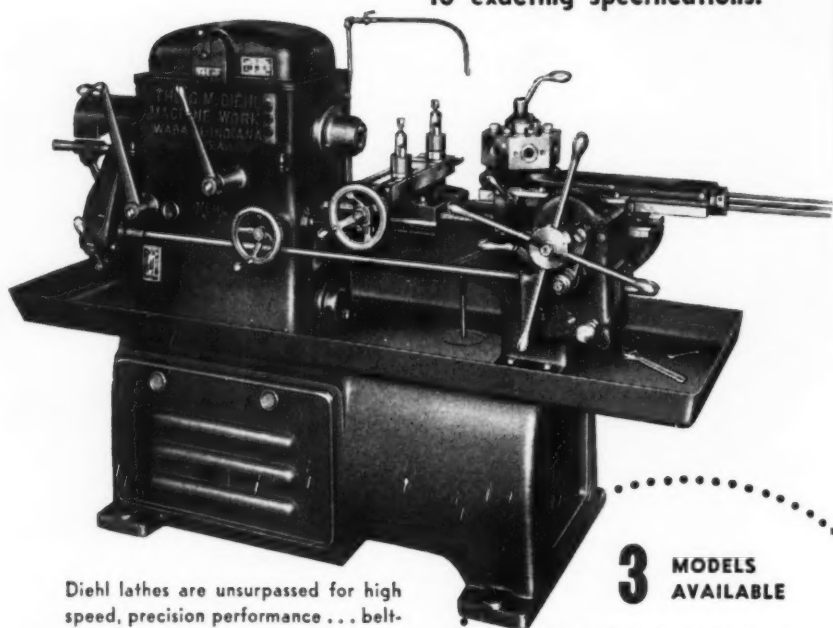
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assure accurate, smooth cutting
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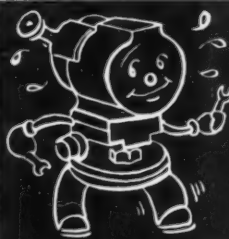
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Automatic Chuck Capacity (round).....1"
Swing-over cross slide.....6"
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Six speedsforward and reverse

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PRECISION INDEXING
.0003 Tolerance

For precision milling and grinding angles, flats, tapers, hexagons and keyways.

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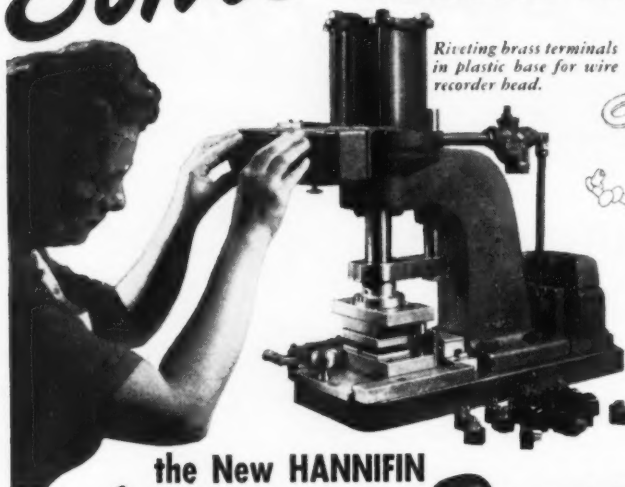
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LOOK AT THESE FEATURES! Designed specifically to help you speed up light, but often troublesome, production operations:

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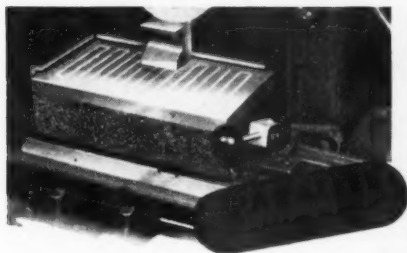
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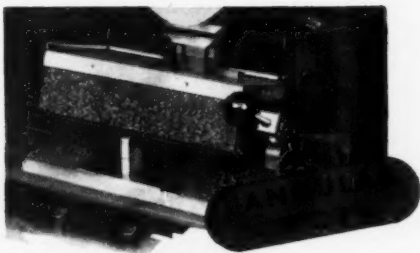
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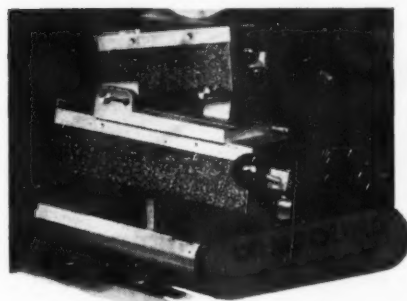
The **MAGNA-SINE** is more versatile than any other magnetic chuck



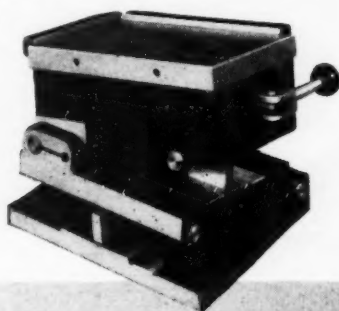
The Magna-Sine, when closed, serves as a conventional magnetic chuck for surface grinders. The chuck is permanent-magnet type and built to precision tolerances. Suitable for either wet or dry grinding.



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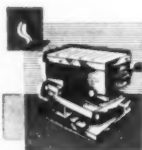


For compound angular work, add another single angle Magna-Sine*. The additional unit may be held securely by the magnetic chuck of the first unit. Any desired compound angle can be set up fast and with positive gauge block accuracy.



* This unit is the Magna-Sine for both single and compound angular set-ups. It can be used for parallel work, single angle or compound angle set-ups. Available in two sizes.

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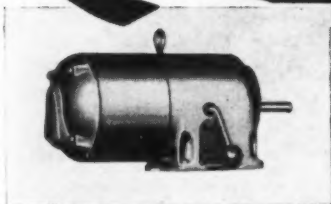
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The "TOGGLEBUG"
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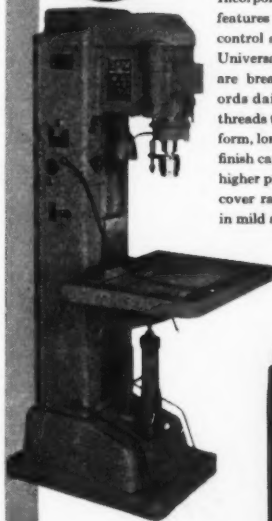
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SNOW THREADING MACHINE — Incorporating all the advanced features of air and electrical control sensitivity, Snow Full Universal Threading machines are breaking production records daily. Highly accurate threads true to lead and thread form, long chaser life and clean finish can be obtained at much higher production rates. 2 sizes cover range from #3 to 1 inch in mild steel.



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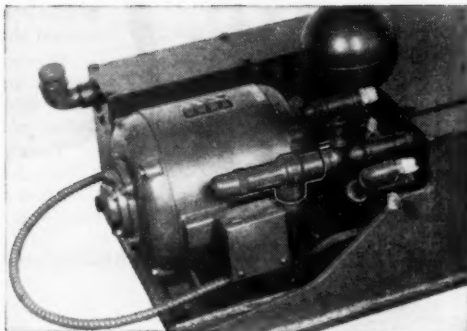
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- CHATTERLESS
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BLANCHESTER, OHIO

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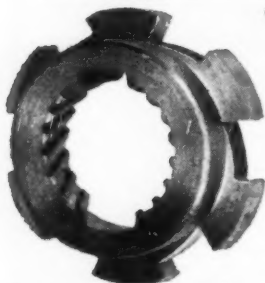


Colonial broaches represent the fastest, surest, precision method there is for removing metal. May be used equally effectively for all kinds of internal or external shapes, regular or irregular.

Wherever they CAN be used, they are bound to give you greater output per machine hour—and that means **REAL SAVINGS**—savings that pay for the tooling cost in a surprisingly short time.

There's a Colonial field representative near you. Ask us to have him figure where and how much *you* can save; how much you can boost your output per machine hour.

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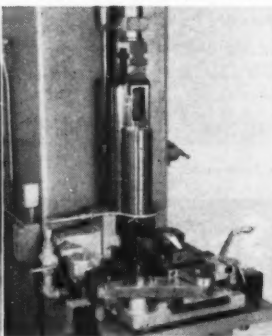
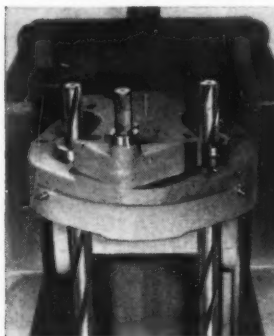
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360 precision parts per hour

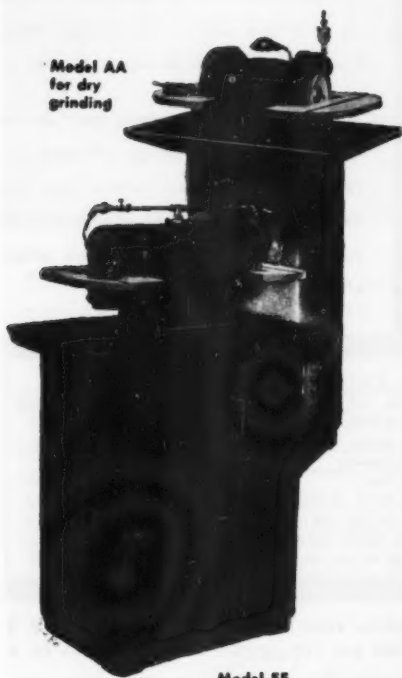


Electrical Breaker Arms
900/hour by surface broaching



GRIND TOOLS TO EXACT ANGLE ..FASTER

Model AA
for dry
grinding



Model EE
for grinding
wet or dry

PROSSER CARBIDE GRINDERS

YOU GET the grinding angle you want instantly with the famous indexing feature of these Prosser high-speed grinders. The quick-acting tables need never be raised or lowered—and once set, they stay put.

ECONOMICAL—You'll save time and you'll get more for your wheel dollar with a Prosser because wheels are easily adjusted to compensate for wear. Wheels can be used up practically 100%.

VERSATILE—Designed by the same Prosser engineers who introduced cemented carbide to American industry, today's Prosser Carbide Grinders are equally effective on stellite and high-speed steel.

Before you get a grinder for rough work or fine finishing, wet or dry... get the facts on the Prosser. For details on bench and floor models, on chip-breaker, drill-grinding and other attachments... write for literature.

DEALERSHIPS AVAILABLE

THOMAS PROSSER & SON

Established

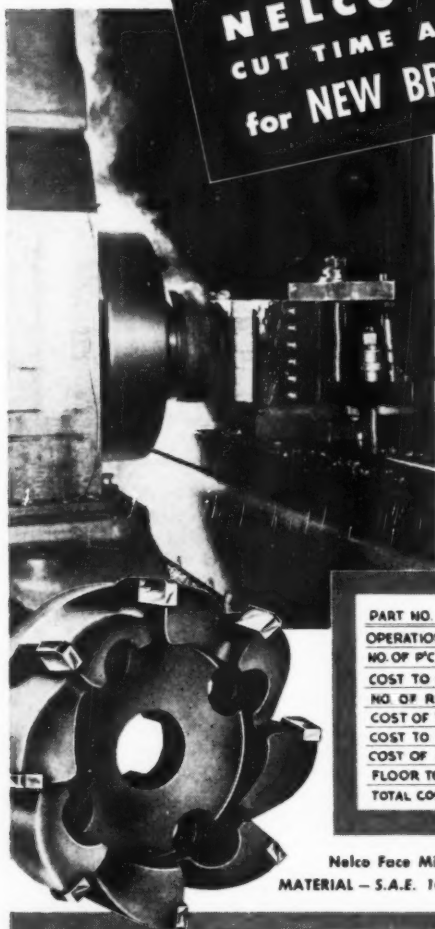
1845

120 Wall Street, New York 5, N.Y.

Here's how

NELCO FACE MILLS

CUT TIME AND REDUCE COSTS
for NEW BRITAIN MACHINE CO.



Milling the Forming Slide Cam blanks for New Britain-Gridley Model 60 six-spindle automatic Bar Machines is done six at a time with the No. 8106F Nelco Face Mill with carbide tipped blades.

The time and cost analysis chart shows the comparative savings effected by Nelco carbide tipped cutters over the tools formerly used. This is only one of many New Britain Parts which are milled efficiently with Nelco Tools.

PART NO. H 407-1782	NAME Forming Slide Cam Blank		
OPERATION 110 mill and		CARBIDE	HIGH SPEED
NO. OF P.C.'S PER GRIND		400	100
COST TO GRIND		\$7.50	\$3.75
NO. OF REGRINDS		8	10
COST OF TIPS		\$8.00	\$16.00
COST TO RETIP & GRIND		\$16.00	\$6.00
COST OF CUTTER PER PIECE		\$.024	\$.054
FLOOR TO FLOOR TIME		1 1/2 min	3 1/2 min
TOTAL COST TO MILL ONE P.C.		\$.144	\$.394

Nelco Face Mill No. 8106F . . . SPECIFICATIONS
MATERIAL - S.A.E. 1045 GAS CUT SPEED - 500 R.P.M. FEED - 15" P.M.

WRITE for descriptive literature and name of your Nelco Distributor.

NELCO TOOLS

For that extra edge in production

NELCO TOOL CO., INC., Manchester, Conn.

LINDBERG *Fisher* BLOWERS



with full
360° positioning
for easy
installation!



Eliminate extra piping and welding—use the shortest and least restricted line to your burners. Full 360° positioning of the new Lindberg-Fisher Blower enables you to connect it in a hurry—at the least possible cost.

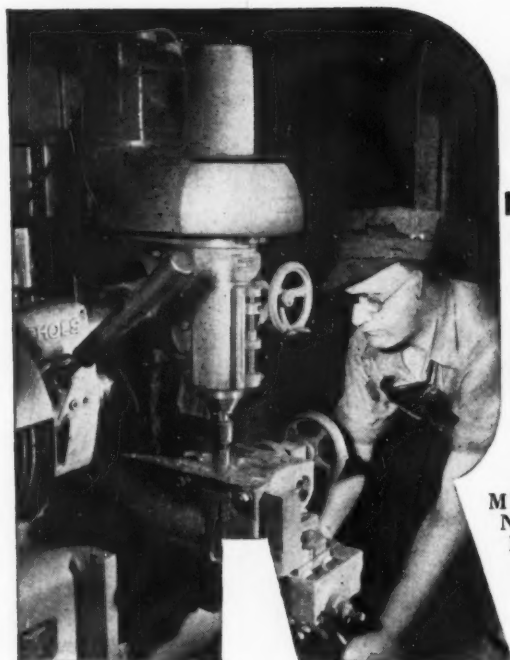
Blower housing and base are light and sturdy. The streamlined curves of the housing result in smooth and efficient operation. The dynamically balanced radial vane impellor, mounted directly on the motor shaft, is the only moving part of the Blower.

Standard 3600 RPM N.E.M.A. frame motors are used exclusively—replacements are as convenient as your nearest motor supplier. Blowers are available from 60 to 2100 CFM. "V" belt drive and combination oil pump models are available when needed.

Ask for Bulletin 740 for full information on pressures, volume, and dimensions.

LINDBERG *Fisher* BLOWERS

Lindberg Engineering Co., 2442 W. Hubbard St., Chicago, Ill.



**INTERNATIONAL
HARVESTER**
KEEPS
**MILLING MACHINES
PRODUCTIVE**
WITH
RUSNOK
MILL HEAD

MILWAUKEE WORKS; INTERNATIONAL HARVESTER CO. uses RUSNOK Mill Head as a vertical attachment on one of their milling machines. In this operation, it is milling a boss on the side of an International Harvester Diesel pump housing.

RUSNOK heavy duty Mill Head quickly and easily converts your horizontal mill to do vertical or angular milling, drilling and boring operations. RUSNOK Milling Attachment takes the place of costly, special equipment — uses no valuable space, just install on your present mill.

Write for name of nearest RUSNOK Mill Head dealer. Let him show you how the RUSNOK Milling Attachment can be an important part of all your milling operations.

A Few Choice Dealerships Are Still Available

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ATTACHMENT

MILLING • DRILLING • BORING

RUSNOK TOOL WORKS • 4840 W NORTH AVENUE • CHICAGO 39, ILL

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Unusual Abrasive
Products Operations

GETTING WHEAT READY FOR BREAKFAST!

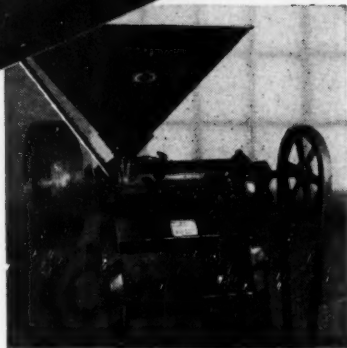


- Bay State abrasive shell liners are used in hulling machines for removing the bran and shining the wheat grain before it is made into puffed wheat. Whatever YOUR grinding problem may be, BAY STATE can solve it . . . fast. Possibly the exact specifications to meet your requirements can be supplied directly from large stocks either in Westboro, branch warehouses, or from our distributors strategically located throughout the United States.

Send us your grinding problems. We can help you.

BAY STATE ABRASIVE PRODUCTS CO.
Westboro, Massachusetts, U. S. A.

Branch Offices and Warehouses—Chicago, Cleveland and Detroit
Distributors—All Principal Cities



Photograph, Courtesy of Marcus Mason & Co., Inc.

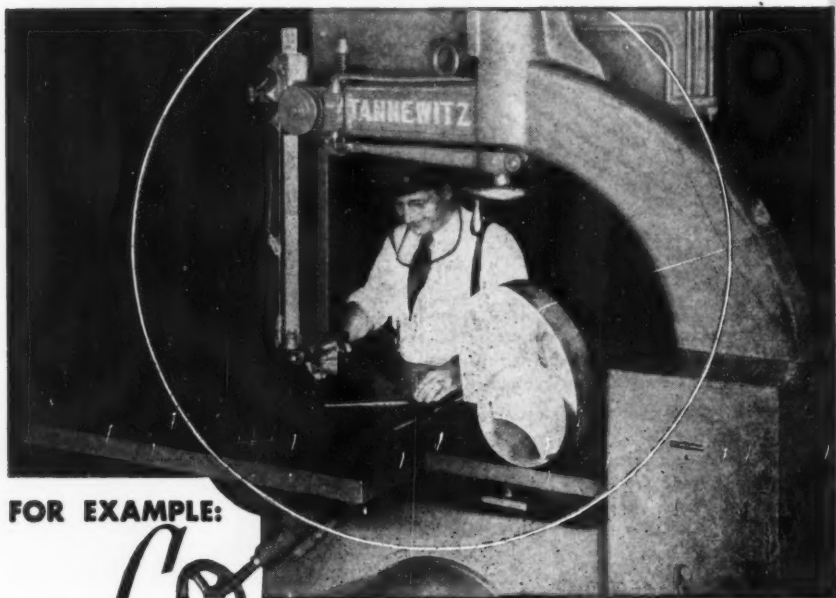


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FRICTION SAWING

solves thousands of Problems!



FOR EXAMPLE:

CUTTING side panels of a barometric damper as shown above. Cost of dies required for seven sizes would have approximated \$12,000—a prohibitive sum for volume required on these sizes. Friction-sawn on a TANNEWITZ High Speed Band Saw in multiples of two in 1.2 minutes each—a very moderate cost which makes feasible the complete line required. Cost of machine was only a small fraction of cost of dies contemplated and it is also available for many other uses.

For trimming castings, formed parts, cutting metal as hard as a file and dozens of other operations, too, friction sawing with TANNEWITZ High Speed Band Saws offers tremendous advantage. Write for free booklet, "FRICTION SAWING."

THE TANNEWITZ WORKS

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LOOK AT THIS PRESS

It's designed to provide industry with low-cost, high production units that are highly flexible in design and operation... relieving heavier presses of short runs and lighter work. Presses are practically fool-proof in operation. Frame is extremely rugged. Fingertip controls are conveniently located at hand level. Available for immediate delivery, in standard width (between uprights) of 24"-31"-36"-42" respectively. Available in special width up to 72" at small additional cost. Movable bed plates. Pumping unit has by-pass relief valve which can be set at any pressure up to press capacity. Presses available for either vertical or horizontal operation. All Standard presses equipped with 2-speed built-in hand pumps for more sensitive and versatile operation.

READ THESE "SPECS":

CYLINDERS: Standard Models furnished with 6" bore, 7½" stroke—spring return type; also 5" bore, 7½" stroke—spring return type. Above presses are standard. Following can be furnished at additional cost: Double Acting, 6" bore, 7" stroke; 6" bore, 11" stroke; 5" bore, 7" stroke; 5" bore, 11" stroke. Special long stroke cylinders also available, up to 48" in length, for incorporation in suitable press frames of our make.

PUMPING UNITS: These units can be supplied in various volumes and pressures, in a total of 13 combinations.

Presses include V blocks, Gauge, Motor Controls, Pressure Regulator, etc., complete and ready to attach to electrical source.

CHECK THESE USES:

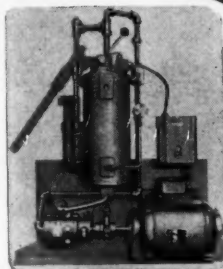
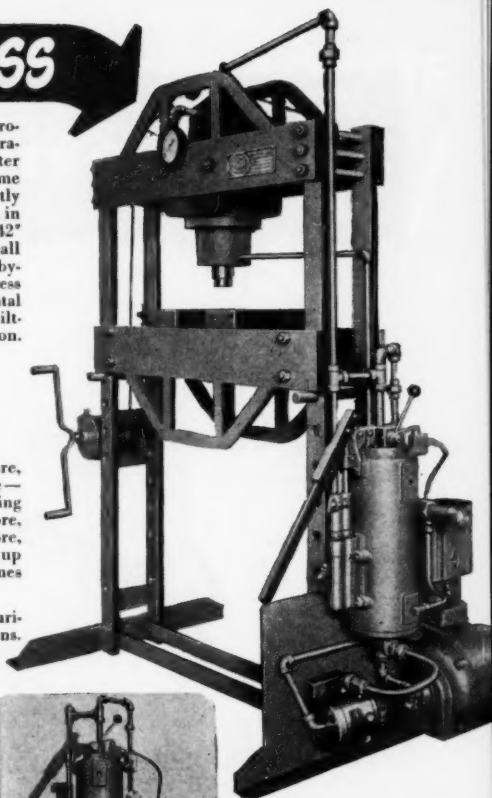
There are so many everyday production uses for these versatile KRW Hydraulic Presses that we have lost count. Here are a few of the more obvious... blanking, forming, bending, broaching, straightening, stamping, embossing, numbering, upsetting, laminating, pressing and hot or cold forging. KRW Engineers are daily developing other uses. If you have only a vague idea of how these presses might be used in your plant, let us have it in a rough form. We'll do the rest.

BEAT THESE PRICES:

Depending upon capacity of pumping equipment, prices of Standard model motor driven hydraulic presses are as follows, F. O. B. Factory: 25-ton press from \$727.00 to \$992.00. 50-ton press from \$806.00 to \$1058.00. 60-ton press from \$1070.50 to \$1135.00. 75-ton press from \$1198.00 to \$1258.00. All motors in the above units are 220/440 volt, 3 phase, 60 cycle. Any change in motor specifications is extra. *Subject to change without notice.

K·R·WILSON

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MODERNIZE AND MOTORIZE YOUR PRESENT KRW PRESS with one of these compact motor drive units. They come complete ready to connect to your press. Require very little extra floor space. Write for conversion unit prices, giving the capacity and serial number of your press.

MAIL THIS COUPON

It will bring you all the money-saving facts about these low cost, high production hydraulic presses. Now is the time to get ready for the highly competitive days ahead.

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Please send me complete information on KRW Motor Driven Presses as follows:

- ☐ 25-ton ☐ 50-ton ☐ 60-ton ☐ 75-ton presses
☐ motor drive conversion unit ☐ Press Cap.

Serial No.

Name

Address

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When You Need
EXTRA DRIVING POWER



USE *Glenzer*

Eject OR Lock
DRIVER



You don't expect a half-horsepower motor to do a one-horsepower job. Likewise, when you have a really tough job — when drills or other tools shift or move, try Eject-OR Locks — you can tighten the nut so they'll hold "Till the cows come home."

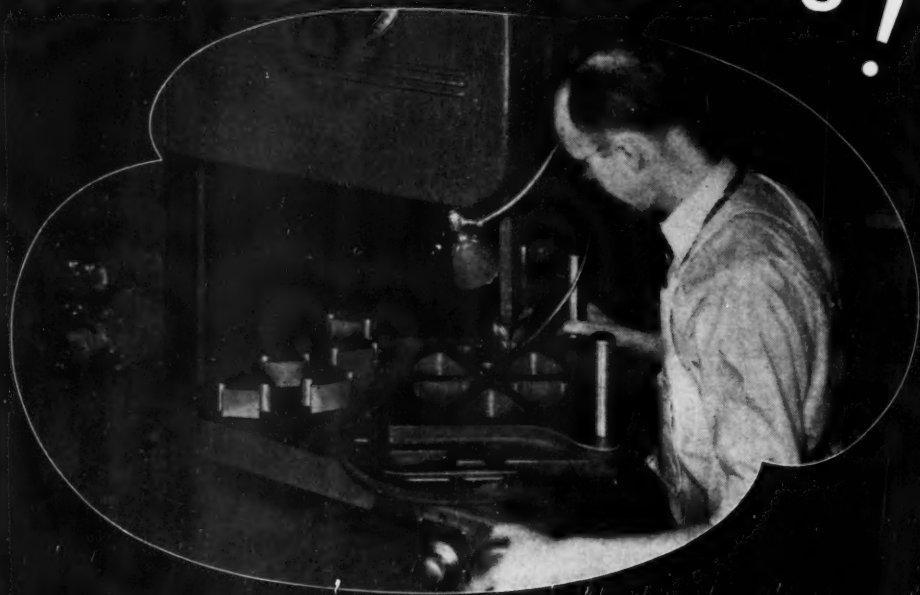
EJECT SAFELY

Tools are ejected by loosening the nut, No pounding a drift, so no danger of new or delicate spindles being thrown out of alignment.

THE J. C. **GLENZER** CO. Inc.

1546 E. NINE MILE ROAD, DETROIT 20, MICH.

Slash Die-Making Costs with Contour Sawing !



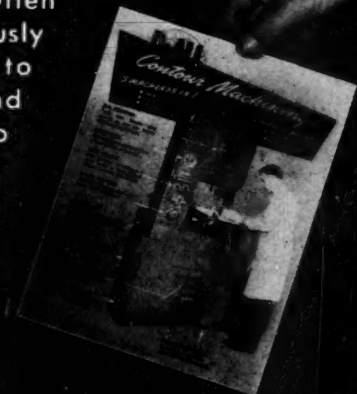
● Needless waste of time and money spent in making blanking dies, by using old "blacksmith method" of drilling, chipping and filing, is eliminated by DoALL Contour Sawing. Often both die and punch are sawed simultaneously from one piece of tool steel. Accuracy to within .005" of layout lines possible. Band files for internal and external filing also available. License for Continental Process of die-making goes with purchase of DoALL Contour Saw. Send today for circular entitled "Contour Machining".



DoALL Co.

World-Famous Contour Saws

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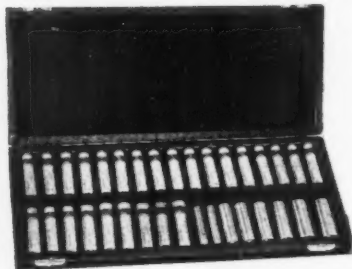


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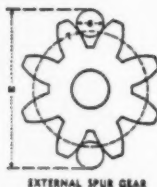
with the

Van Keuren >>>> GEAR MEASURING SYSTEM

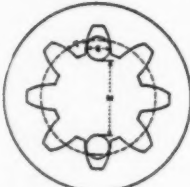
Spurs, Helicals, Splines, Serrations



Set No. 26 EX. External Gear Measuring Wires. \$140.00.



EXTERNAL SPUR GEAR



INTERNAL SPUR GEAR



SIMPLE . . .

RELIABLE . . .

ACCURATE . . .

THE Van Keuren Gear Measuring System is generally accepted as the easiest and most accurate method of checking tooth thickness of gears, 30° involute splines and 90° involute serrations. A measurement is made over two opposing wires and this actual measurement is compared with the theoretical measurement over wires for a perfect gear as computed from the Van Keuren tables for 1 diametral pitch gears.

The only equipment required is a set of 2 wires of the proper size for each diametral pitch.

Standard sizes of wires available from stock are:—

1.728"	for external spurs and helicals
DP	
1.44"	for internal spurs and splines
DP	
1.92"	for enlarged pinions, 30° involute splines and 90° involute serrations
DP	
1.68"	
DP	Alternate series for special requirements.

For spur gears, involute splines and serrations, the only calculation is one of simple division. For helical gears use the simplified computation forms VK-103, VK-104 or VK-105.

The 1.728"/DP System is used by over 90% of American gear producers and users. The 1.44"/DP and 1.92"/DP systems have been incorporated in standards for involute splines and serrations.

The Van Keuren Gear Tables are complete for gears from 5 to 500 teeth and for pressure angles of 14½°, 17½°, 20°, 25° and 30°. If the measurement over the wires is greater than the value calculated from the tables, the tooth is too thick and the cutter must be fed further into the gear blank. Constants for controlling tooth thickness and backlash to .0001" are given for all pressure angles.

VAN KEUREN CATALOG AND HANDBOOK NO. 34

This 208 page volume represents 2 years of research sponsored by the Van Keuren Co.

It presents for the first time in history a simple and exact method of measuring screws and worms with wires.

It tells how to measure gears, splines and involute serrations. It is an accepted reference book for measuring problems and methods.

Copies free upon request.



THE *Van Keuren* **CO.,** 171 Waltham Street, Watertown, Mass.

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Light Wave Equipment • Light Wave Micrometers • Gage Blocks • Taper Insert Plug Gages • Wire Type Plug Gages • Measuring Wires • Thread Measuring Wires • Gear Measuring System • Shop Triangles • Carbide Plug Gages • Carbide Measuring Wires

SHAVING ASSURES BETTER GEARS AT A GREATER OVER-ALL

Production Economy



This gear shaving machine, the first of its kind, was introduced 16 years ago to fulfill the urgent need of gear manufacturers for a means of correcting precision gears and gears produced to operate under critical loads and speeds — these corrections to bring them within required tolerances.

Today, it is being used by all the leading manufacturers in the automotive industry, the majority of gear jobbing shops and nearly all the machine tool builders.

One gear manufacturer says shaving has reduced rejects which formerly amounted to about 50% to none. Another says that shaved gears have cut operating power requirements approximately 20%.

Gear shaving eliminates the need for skilled machinists, regardless of the degree of precision required. Accuracy does not depend on the shaving machine operator. Shaving also makes it easier to turn out acceptable gears. The teeth of shaved gears have uniform accuracy and the characteristics of all the gears in any lot will be uniform.

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SPUR AND HELICAL
GEAR SPECIALISTS
ORIGINATORS OF ROTARY SHAVING
AND ELLIPTICAL TOOTH FORM



NATIONAL BROACH AND MACHINE CO.

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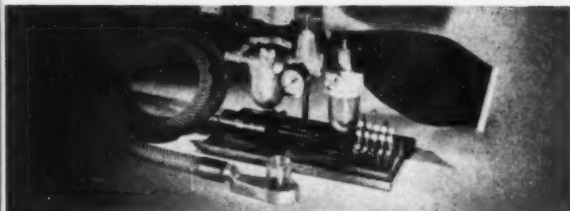
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WORLD'S LARGEST PRODUCER OF GEAR SHAVING EQUIPMENT

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79

COMPLETE SYSTEM INCLUDES DUST ELIMINATION



WHEN Jig Grinding is required you can have it quickly and economically with the Vulcanaire. Place in the spindle of your Jig Borer (or Mill).

AND YOU CAN . . . locate—finish grind holes in hardened steel to "tenths" at controlled speeds up to 65,000 R.P.M. . . grind dowel holes—square with a ground base . . . move location of holes in hardened steel blocks . . . grind interchangeable holes in hardened sections . . . grind .032 to $\frac{1}{8}$ " holes with diamond impregnated laps . . . grind contours and relief with tungsten carbide burrs . . . grind radii in die sections . . . grind contours in gages . . . jig grind large and awkwardly shaped components . . . eliminate jig bushings in tools where close spacing is essential.

RESULTS! Jig ground requirements are being designed into tools by the most enlightened engineering departments . . . Jig ground the hardened die, stripper plate, and die holder all fit together . . . uniform clearance means longer runs.

ADVANTAGES! the investment is less than for many Jig Boring accessories such as a rotary table . . . the Vulcanaire can be put on and taken from the machine in a few seconds . . . the Vulcanaire is completely portable (all accessories are platform mounted) . . . the system can be used between several machines of various capacities . . . employing both

JIG GRINDING

with the

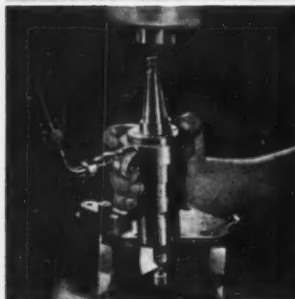
Vulcanaire

the 10,000 and 20,000 series, components with various sized holes from the very smallest to $\frac{1}{4}$ " in diameter can be Jig Ground . . . the average Jig Borer operator becomes proficient at Jig Grinding after very little experience.

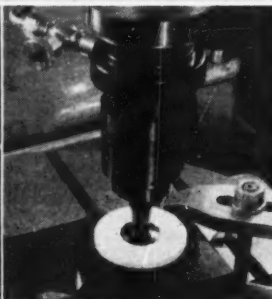
TOPS IN PRECISION . . . the Vulcanaire is precision built throughout and is constructed of alloy and tool steel. Super precision bearings, preloaded with our special fixtures are used, with all traces of radial and end clearances removed, resulting in Vulcanaire Jig Grinding to "tenths" . . . for quotation and literature please mention machine tool application.

VULCAN TOOL CO.

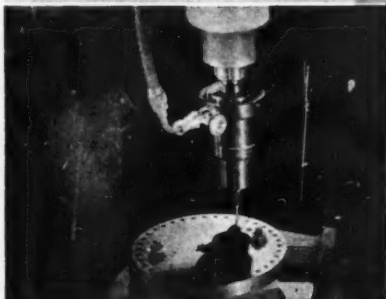
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Dayton 10, O.



10,000 SER. $\frac{1}{16}$ "- $1\frac{1}{2}$ " HOLES



20,000 SER. $1\frac{1}{2}$ "-4" HOLES
ADAPTORS INTERCHANGEABLE



FOR JIG BORERS OR MILLS



SPECIAL Center Drills by Reltool

With the enlarged and modern facilities afforded by its new manufacturing plant . . . Reltool is in an advantageous position to supply SPECIAL CENTER DRILLS to meet your most exacting requirements. When regular Reltool Center Drills . . . Standard or "Shockless" . . . won't fill the bill . . . remember that Reltool can furnish "SPECIALS" promptly, at reasonable cost. Mail sketch and specifications or sample of work-piece for estimate.

The Standard RELTOOL Line Includes: —

Center Drills • End Mills • Key Seat Cutters • Lathe Mandrels • Milling Cutters — *all types* • Metal Slitting Saws • Tool Bits • Counterbores • Form Tools • Reamers • Taps. If you don't have the latest Reltool Catalog, write for it today.

We are seeking additional Sales Representation.

 **Reltool CORPORATION**
RELIABLE METAL CUTTING TOOLS

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MILWAUKEE 14, WISCONSIN

DRILL 2 TO 8 HOLES .

... at one Stroke!

**ADJUSTABLE TO
ANY HOLE PATTERN**

There's Only One

MULTI-DRILL

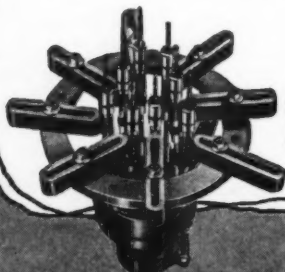
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WILL FIT ANY DRILL PRESS

You don't buy a drill head every day. When you do . . . select the head that has set standards of performance, strength and dependability—choose the drill head that has led the way. MULTI-DRILLS have always delivered topmost efficiency and

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Send me free folder describing the Milmaster
"that converts one machine into a tool shop."

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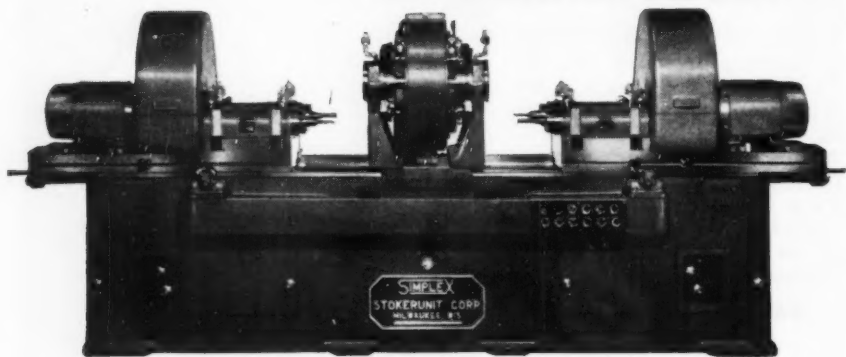
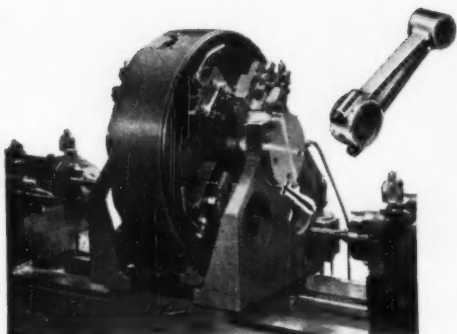
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SIMPLEX

Small high speed gas engines run at speeds unbelievable a few years ago yet with mechanical failures rare due to the increasingly high standard of workmanship on the running parts, but costs must be reduced to reach the volume market. SIMPLEX Precision Boring Machines with SIMPLEX engineered tooling are used for this purpose by many leading manufacturers.



This SIMPLEX 2U 2-way Precision Boring Machine with double-faced automatic indexing trunnion fixture is tooled for semi-finish and finish boring small die cast aluminum connecting rods with bronze inserts. Boring tolerances are plus .0003, minus .0000. Interchangeable fixtures are provided so that several different size rods can be run on one machine. This principle is applicable to many size rods where maximum production and accuracy at low unit cost are required.

Precision Boring Machines

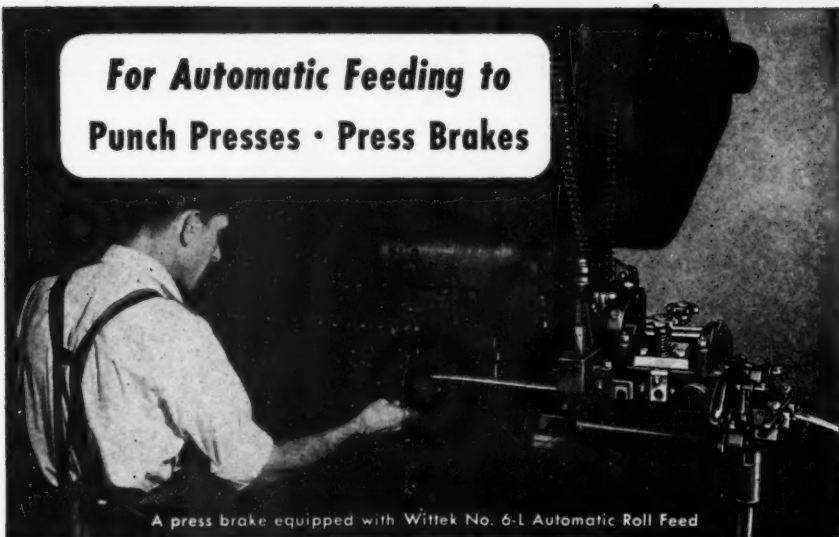
STOKERUNIT CORPORATION

SIMPLEX Machine Tools Division

4530 West Mitchell Street, Milwaukee 14, Wisconsin

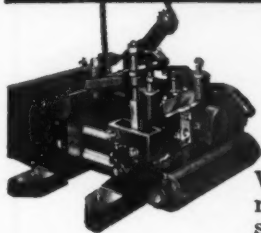
Precision Boring Machines, Planer Type Milling Machines and Special Machine Tools

For Automatic Feeding to Punch Presses • Press Brakes



A press brake equipped with Wittek No. 6-L Automatic Roll Feed

You Can't Beat WITTEK



Wittek Roll Feeds are made in standard models to meet every requirement in the automatic feeding of strip stock to punch presses or press brakes. The distinguishing feature is their simple and economical method of operation which does away with complicated parts thereby assuring *speed* and *accuracy* in the feeding of various kinds and thicknesses of material.

Wittek Adjustable Reel Stands are designed as companion units to Wittek Automatic Roll Feeds and are available in seven different models to handle *ALL* types of coiled strip stock and wire being fed to punch presses or similar production machinery.

Special units of Wittek Automatic Roll Feeds and Adjustable Reel Stands are engineered to meet unusual requirements.

Write for complete descriptive literature

WITTEK Manufacturing Co.

4321 W. 24th Place
Chicago 23, Ill.

Automatic
**ROLL FEEDS AND
REEL STANDS**



Cuts Off Tubing, Pipe and Shafting— **FAST**

If your production requires cutting off tubing, pipe or shafting in quantities, particularly in long lengths, check the figures below against your present time.

1/2" Tubing

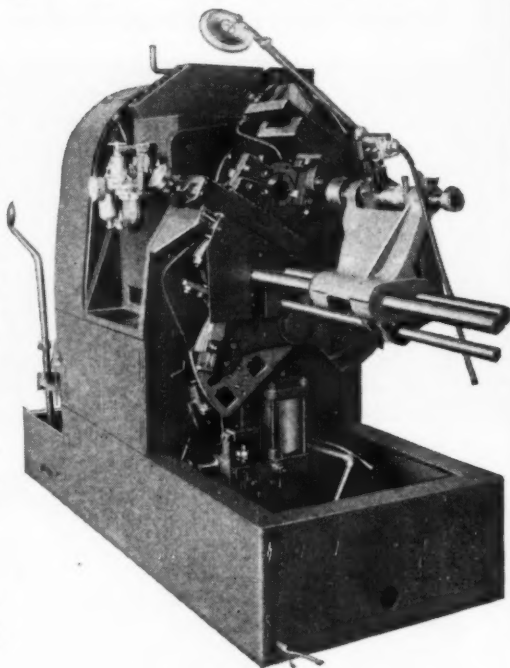
This machine cuts off and chamfers both outside edges of 1/2" .030 wall tubing, 5" long at the rate of one every 2.5 seconds.

1 1/4" Cold Rolled

This machine cuts off and chamfers both ends of 1 1/4" cold rolled, 20" long, at the rate of one every 20 seconds.

1" Tubing

This machine cuts off and chamfers both outside edges of 3" long, at the rate of one every 3 seconds.



The NEW MODERN AUTOMATIC CUTTING-OFF MACHINE

These popular, time saving machines are now available in two sizes, handling work up to 3" O.D. Their many cost cutting features are described and illustrated in our latest catalog that will be mailed promptly on request.

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MODERN MACHINE TOOL CO.
Jackson, Michigan

for "C" CLAMPS . . .

BETTER BUY BILLINGS

BECAUSE



MODEL SR Completely cadmium plated to minimize adherence of welding spatter. Deep throat, plenty of clearance for body work, welding, etc. Strength with rapid adjustment.

MODEL AZ Heavy Duty! Designed and engineered to do a job of reliable holding. Look at that rib section. Open throat, heavy screw rugged all the way.

MODEL BB For body building, woodworking, etc. — light duty work where deep throats are required.



Billings Carbon Steel Drop Forged "C" Clamps are skilfully designed and engineered holding tools produced with the proper mechanical ratio between the various parts. The results achieved — strong Clamps with the possibility of springing minimized and light in weight . . . Unique rib design of body gives full strength with less weight . . . Length of tapped hole in head and length of screw relatively proportioned for greatest holding power . . . Handles, in all sizes, are correct in length to permit easy arm-power leverage . . . Many Billings "C" Clamps have the popular and practical Swivel Base for holding tapered parts or fixtures . . . Model GS illustrated above.

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FROM BILLINGS INDUSTRIAL SUPPLY DISTRIBUTORS

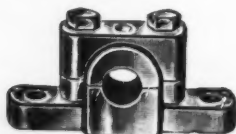
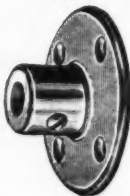
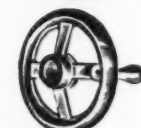
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The castings displayed on this page are just a part of our Stock Line. You save time and money when you use Chicago Castings.

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For complete information write for CATALOG No. 49A

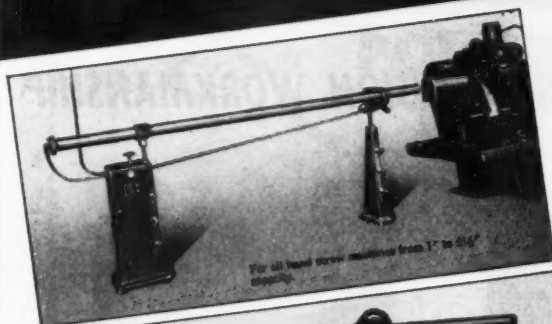


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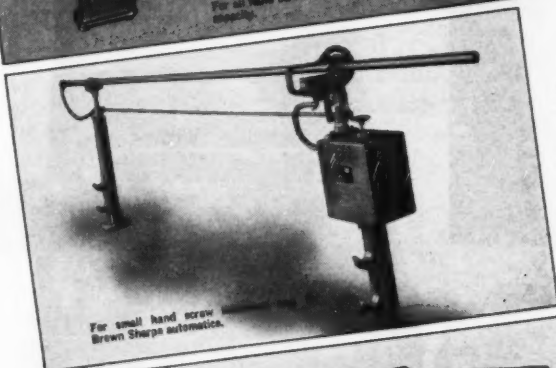


IN ONE FEED-OUT

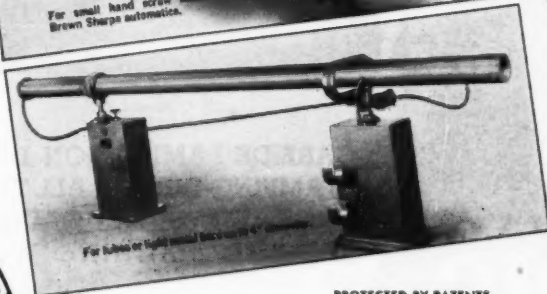
can you feed any desired length
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For all hand screw machines from 1" to 6 1/2"



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LiPe Bar Feeds make long feed-outs possible. The piece is not grabbed by feed fingers; instead, it is pushed automatically by an air driven piston.

Feed-fingers and feed-finger mechanisms are eliminated entirely, yet these Bar-Feeds will feed any required distance right up to the smallest end-piece. This is done without marring, scratching, or deforming. A fast, safe method that steps up production, saves spoilage!

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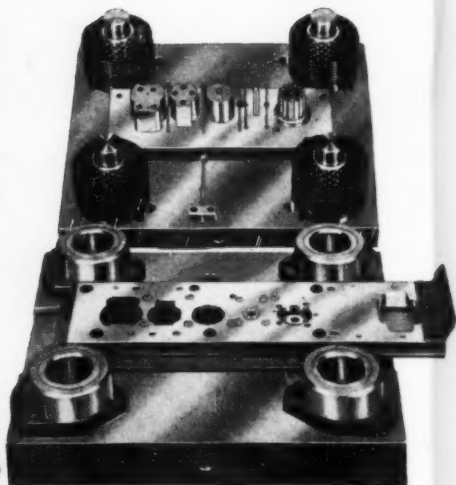
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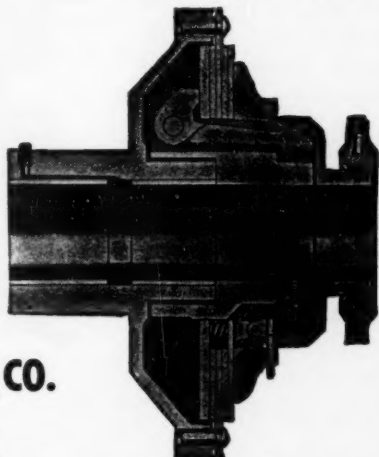
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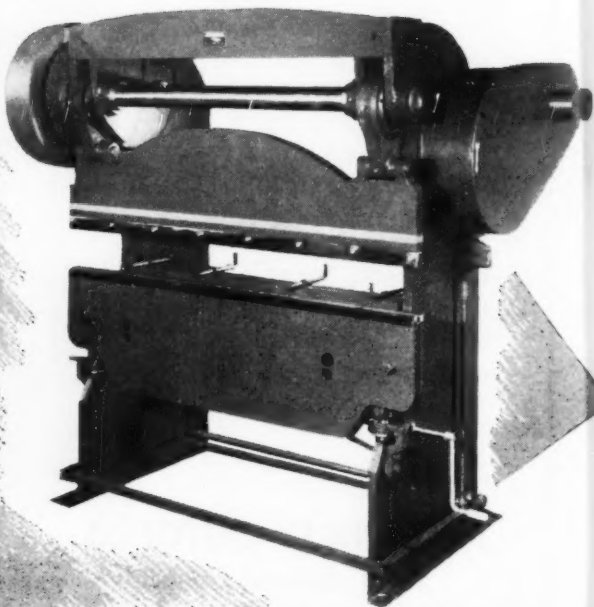
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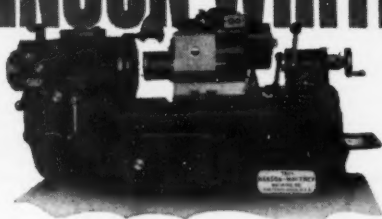
This press will do your work well and efficiently. Dependable service is guaranteed and proven by many years of operation. Variable speed drive for speed and safety.

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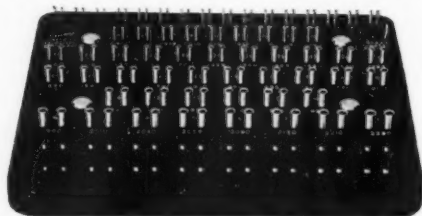
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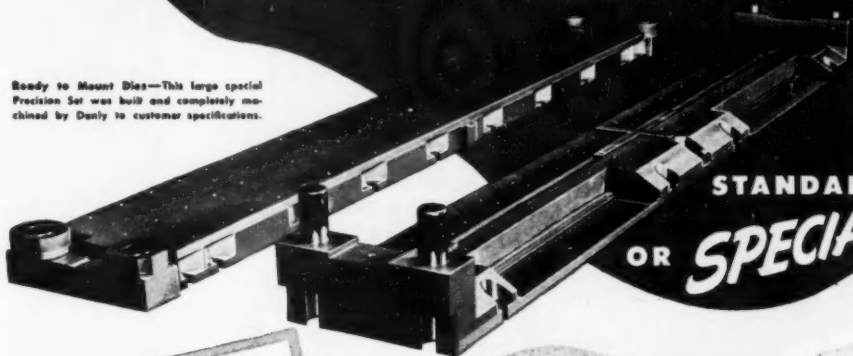
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Ready to Mount Dies—This large special Precision Set was built and completely machined by Danly to customer specifications.



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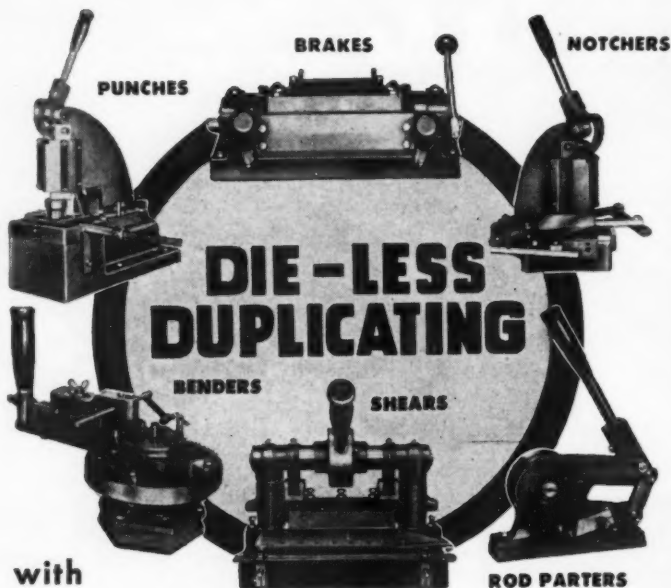
Danly's complete machining and handling equipment is available for any required work on die sets of any size or shape. The necessary machining for mounting dies can be handled efficiently at the time the die set is produced. This special machining by Danly saves time for tool rooms and die shops, and helps speed die deliveries. It permits devoting die making equipment and personnel exclusively to die work. Perhaps you can use this type of service on your next job. Ask for special quotations.

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OVER 25 YEARS OF DEPENDABLE
SERVICE TO THE STAMPING INDUSTRY



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di-acro PRECISION MACHINES

Eliminate dies . . . speed production . . . in both your experimental and quantity run duplicating operations. An unusually wide variety of both simple and intricate parts can be precision made by "DIE-LESS DUPLICATING" with the individual or co-operative application of Di-Acro Precision Machines (see examples at right). Di-Acro Machines are now offered in a total of six types and 21 different sizes, including two new units—a power driven Shear and a hydraulic Bender.



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ENGINEERS — DESIGNERS — PRODUCTION MEN should all have this informative catalog which contains technical data covering Di-Acro Machines and our offer of "Die-Less Duplicating" Engineering Service to aid in solving design and production problems. WRITE FOR YOUR COPY TODAY.

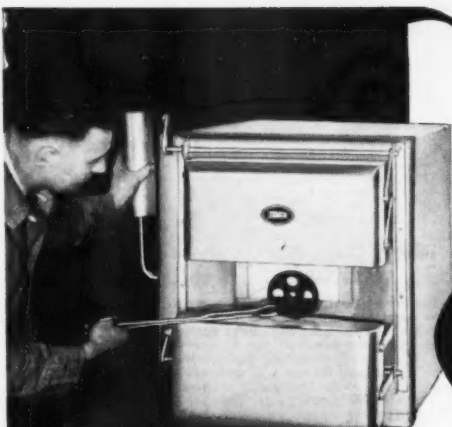
← Pronounced "DIE-ACK-RO"



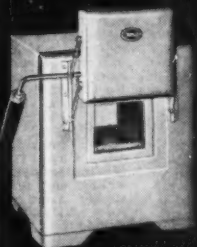
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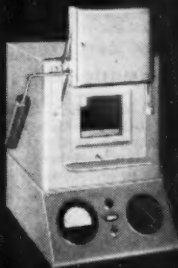




SERIES 1700—Two models: with chamber sizes $8\frac{1}{2}$ " W, $7\frac{1}{2}$ " H, $13\frac{1}{2}$ " D or $8\frac{1}{2}$ " W, $7\frac{1}{2}$ " H, 18" D. Both for 230-volt operation. Prices—\$250.00 to \$405.00 complete with controls.



SERIES 1600
—Two models: with chamber sizes 5" W, $4\frac{1}{2}$ " H, 9" D and 5" W, $4\frac{1}{2}$ " H, $13\frac{1}{2}$ " D. 115 or 230-volt operation. Prices—\$140.00 to \$280.00 complete with controls.



SERIES 1500
—Two models: with chamber sizes 4" W, $3\frac{1}{2}$ " H, $4\frac{1}{2}$ " D and 4" W, $3\frac{1}{2}$ " H, 9" D. 115 or 230-volt operation. Prices—\$87.50 to \$107.50 complete with stepless control.

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**FOR HEAT TREATING TOOLS, DIES, PARTS
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Do your own heat treating... right in your own plant or shop... save time and costs, eliminate sending work "outside". Investigate this rugged *entirely new* TEMCO line today... welded steel construction, heavy dual insulation! Fast-heating and can be operated continuously up to 1650°F ., intermittently to 1900°F . Use for hardening and tempering of tools, dies, parts and small unit production. Ideal, too, for lab testing and process control. Write today for data and your nearest dealer's name.

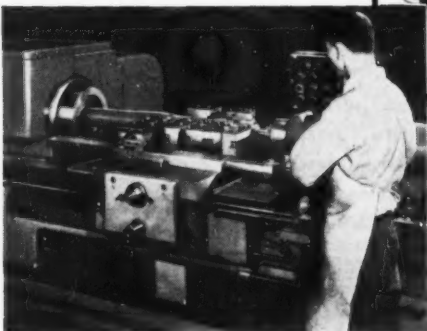
**THERMO ELECTRIC
MANUFACTURING CO.**

486-6 W. Locust St., Dubuque, Iowa

How to Cut

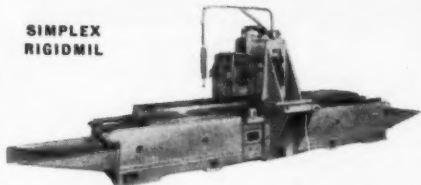
Your Metal Working Costs with Sundstrand Machines and "Engineered Production" Service

Here are some representative examples of machine tools and services offered by the Machine Tool Division of Sundstrand. Standard basic machine designs and units, coupled with methods engineering assistance, has resulted in many cost-saving Sundstrand installations. If you have metalworking operations in your plant, and are interested in lowering manufacturing costs, call in a Sundstrand representative. He'll be glad to assist you in obtaining more economical methods. There is no obligation for this service.



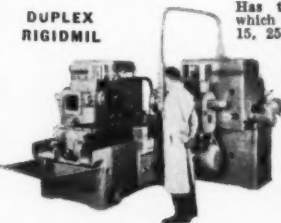
These Machines Plus Engineering Service to Solve Milling Problems...

**SIMPLEX
RIGIDMIL**



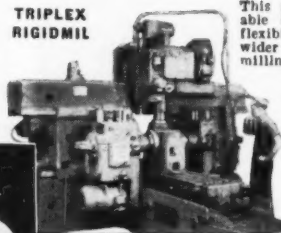
Performs slab or face milling with single spindle. Can be furnished with 25, 30, 40, 50 or 75 horsepower heads. Table widths are 18", 24", or 30", with feed strokes up to 144 inches.

**DUPLEX
RIGIDMIL**



Has two opposed heads which can be furnished in 15, 25, 30, 40 or 50 HP capacities. Table widths and feeds are same as Simplex Rigidmil. Spindle heads mounted on adjustable columns to facilitate wider range of work. Machines can be furnished with power adjusted or fixed columns.

**TRIPLEX
RIGIDMIL**



This machine has adjustable heads which add flexibility for handling wider range of production milling jobs. Heads can be operated to mill three sides of a work piece simultaneously or operate individually. Capacity of heads, table widths and feed strokes same as for Simplex Rigidmil.

For Both Short-Run and Mass Production, Use Sundstrand Automatic Lathes and Engineering Assistance Models 4, 8, 10, 12 and 16 single spindle automatic lathes handle a wide variety of short or long run turning, boring, facing or forming operations. Can be furnished with one, two or three tool heads. Available in varying speed combinations and lengths, with work capacities ranging from 3 to 75 HP.

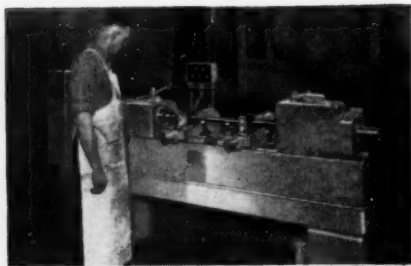


RIGIDMILS • FLUID-SCREW RIGIDMILS • AUTOMATIC LATHES • HYDRAULIC EQUIPMENT



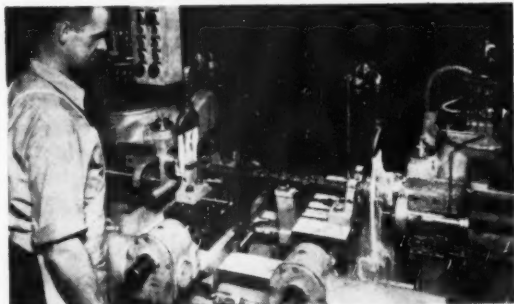
Special Machines for Milling, Turning, Boring, Centering

When standard machines cannot be tooled to suit your needs, or if your production requires the purchase of too many duplicate standard machines, ask Sundstrand engineers to work out a practical solution in the form of a special machine tool. For instance, the machine illustrated above was designed to mill 3 sides of automobile cylinder blocks. Machine has a full automatic cycle.



Centering Machines with Hand or Power Feed

Designed and built to drill or center one or both ends of work-pieces prior to turning or other machining operations. Can be furnished with either power or hand control and with a combination of power feed and hand operated vises, or manual feed and power operated vises.



Milling and Centering Machine

If your work includes milling to length and centering of either big parts or small parts, you will save time and get more accurate work with a Sundstrand Milling and Centering Machine. It saves time because it mills to length and centers in the same set-up. The work is handled once instead of twice. Extreme accuracy is obtained by performing both operations with a single clamping of the part, thereby maintaining a definite relation between the ends and centers.

Shown is a Sundstrand Milling and Centering Machine for handling a range of work from 1" to 3 3/4" diameter and 8" to 48" long. Other sizes of similar machines are available.

Balancing Tools

For balancing, straightening and truing operations... Made in 8 standard sizes and types carrying two accurately ground discs mounted on hardened and ground spindles. All discs are carefully balanced, accurately ground and sensitively mounted for true rotation.



Bench Centers

For testing and checking parts between centers. Each bench center includes the bed and two heads. Complete range as follows: 6" by 18", 6" by 36", 12" by 36", 12" by 48", 12" by 60" and 12" by 72".



FREE Complete Data

on any or all of these machines is available. For complete set of literature ask for Bulletins 485.



SUNDSTRAND MACHINE TOOL COMPANY

2535 Eleventh St. • Rockford, Ill., U.S.A.

DRILLING AND CENTERING MACHINES

SPECIAL MILLING AND TURNING MACHINES

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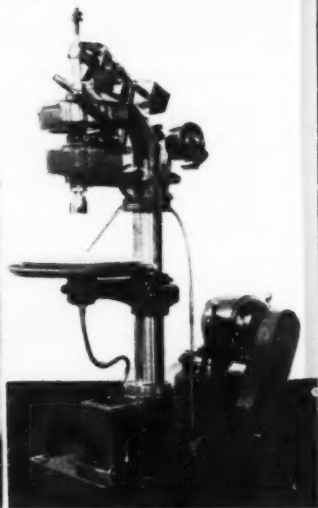
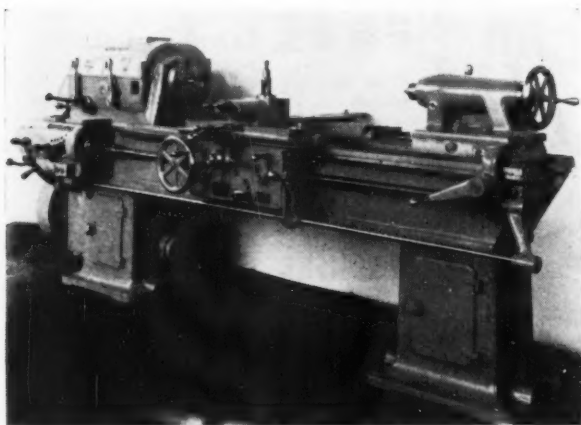
**FOR
HIGH QUALITY
PRODUCTION
MACHINES**

TRY

Western

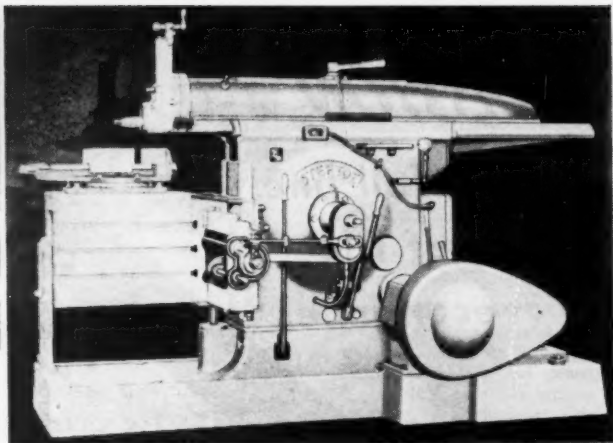
CHARD LATHES — Timken Bearing equipped—Geared multispeed or cone head — Precision hollow spindle — Centralized controls — Full line of accessories. Available in five sizes: 16", 18", 20" 24" & 28" swing over bed. Write for catalog No. B4940.

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PERS**—"Operator's responsibility ends at the starting lever"
—Full range of sizes and multiple heads 3/16" to 3" diameter taps — Timken bearing equipped — Adjustable torque — Precision depth and reverse control—Less tap breakage — Production estimates on request. Write for catalog No. B4812-S—Specify sizes.

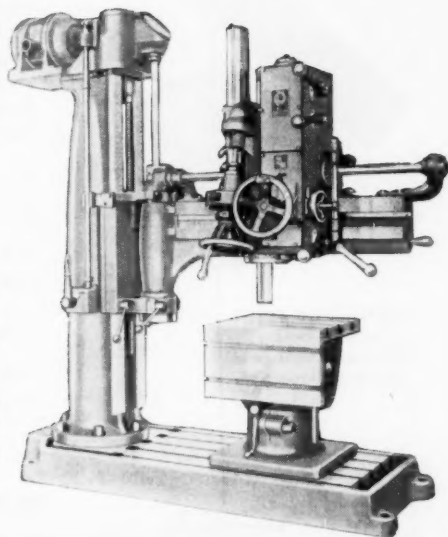




STEPTOE SHAPERS — Vee type ram — Centralized controls—Fully Timken bearing equipped — Forced feed lubrication—Multiple disc clutch—Helical bull gear—Involute splined shafts—4 or 8 speeds—7 heavy duty sizes. America's oldest and best shaper. Write for catalog No. B4820.



WESTERN HIGH SPEED RADIAL DRILLS — for economical high production—"DOUBLE LOW-HUNG" spindle drive—12 speeds in head, 40—2000 R.P.M.—made in six sizes — Ball bearing throughout — Write for catalog No. B4431.



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economies**



STAGGERED TEETH
stop file tracks . . .
help your work pass
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You can't stump Disston Bite-Rite
Files—made for every purpose.

Just pick a file-killing job. Then go to work
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your costs shrink. And that's typical of all
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specify DISSTON SUPERFINE SWISS
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CARBOLOY FITTED CIRCULAR SAWS
. . . METAL CUTTING BAND SAWS ON
SAFETY REELS.

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Featured in this issue

NEW ENGINE LATHE SLASHES MACHINING TIME ON STEEL MILL ROLLS.

A new lathe which promises to revolutionize the turning of steel mill rolls in the steel industry has been announced by The Monarch Machine Tool Co. The new lathe promises tremendous increases in production, elimination of an inventory of thousands of tools, and a substantial reduction in labor costs. The lathe is tracer-controlled and utilizes carbide tools at speeds up to 110 surface feet per minute. Page107

FUNDAMENTAL PRINCIPLES OF DRAWING DIES, by C. W. Hinman.

This is the concluding article in Mr. Hinman's excellent series on drawing dies. Discussed in this article are press design, designing a double-action die and operation of the die. Previous installments appeared in the February and April 1949 issues of the MACHINE and TOOL BLUE BOOK. Page114

LETTER FROM ENGLAND. Page125

ARC WELDING A HOUSING CASE FOR HYDRAULIC DRIVE, by George Pheil.

Here is a resume of the use of arc welding as applied to an ordinary job. Step-by-step description of the operation is given, as well as reasons for using arc welding instead of another fabricating method. The cost of housing, in units of three, is worth close study. Page130

EFFICIENT MATERIAL HANDLING KEEPS MOTOR PRODUCTION FLOWING SMOOTHLY.

High production costs dictate a close scrutiny into every operation for cost-cutting improvements. In materials handling, the average manufacturer can definitely slash his costs to the bone. The Reliance Electric and Engineering Co., in its Ashtabula, O., plant is using material handling with gratifying results. Page134

SELECTING THE EQUIPMENT TO BE OFFERED, by E. Payson Blanchard.

In this, the 18th lecture in the NMTBA Sales Refresher Course, a few fundamentals are laid down which govern the procedure of the salesman in offering certain types of equipment. The determining factor depends upon careful analysis of the problems of the customer. Page147

THE WRITTEN WORD, by C. Denson Day.

The 19th lecture explores Sales Proposals; how, why, when, and where. To often a sloppily prepared proposal loses an order, or causes additional work for the buyer and the machine tool builder's engineering and sales departments. There is a right and a wrong method of preparing proposals. If done properly, proposals are a selling tool. Page165

WHAT'S NEW IN METALWORKING

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SHOP HINTS. Page292

MECHANICS THROUGH THE AGES.

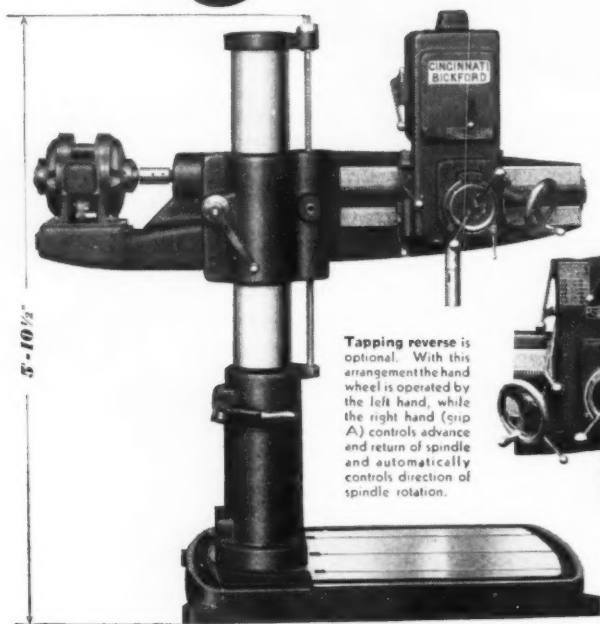
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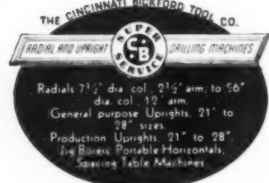
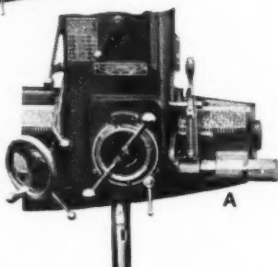
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SMALL MACHINE...

big Production-



Tapping reverse is optional. With this arrangement the hand wheel is operated by the left hand, while the right hand (crisp A) controls advance and return of spindle and automatically controls direction of spindle rotation.



**Equal Efficiency of Every Unit
Makes the Balanced Machine**

Basic features that lower costs in the field of small, high-speed drilling and tapping are found in the 21 1/2' arm simplified design Cincinnati Super Service Radial.

High speeds (to suit your job). Low investment (through simplified design and a completely jugged production setup).

Power saving (one horse power motor), saving in floor space, and speedy operator handling through convenient finger touch controls.

These small machines are accurate and sturdy, and are built to steadily produce at low costs.

Write for Bulletin R-26-A for details of the many new features found in these machines.

THE CINCINNATI BICKFORD TOOL CO. Cincinnati 9, Ohio U.S.A.

As the editor SEES IT

THE PRESENT IN TERMS OF THE FUTURE

We recently had an interesting session with the chairman of the board of a large mid-western manufacturer. Here are some of his blunt statements.

"Business," he said, "has nothing to fear. We, in our business, look ahead with optimism. The markets are there, so is the desire to buy, and the purchasing power is available to satisfy the desire. However, business must look sharp to match the customer's desire with the customer's idea of how much he will spend to satisfy this desire. During the last seven years neither business nor the customer cared much for the "how much" of an article, nor the "how good", but were primarily concerned with the "when". Under this system, quality suffered; it led to a warped price situation, especially on consumer items. Too frequently a second, or third-line product which a manufacturer would not have dreamed of selling in 1939 as his first-line product, was his star performer in past years. These products had best be returned to the scrub team.

"I think price adjustments must be made quickly. Products must be improved. You can't reduce quality, increase prices, and hope to have prosperity.

"Of all business, I think the metalworking industry has been the most intelligent in its business practices. Their quality, especially in machine tools, has constantly improved. We, here, have purchased many new tools, and

have made big strides in improving our production. We shall continue to purchase new tools whenever and wherever their need is apparent.

"It is my opinion that business, generally speaking, has fallen down on its production job. It was so easy in past years to add on another shift and thus raise production. Now these shifts are disappearing to the detriment of general purchasing power. A general readjustment is needed. Latest equipment, redesign to take advantage of newer, better materials, new methods of manufacturing to convert unskilled help into skilled help can do wonders. Nothing is as costly as unskilled help; it must be converted into skilled help by means of mechanical equipment. The purchasing policies must be reviewed with the idea of buying to best advantage and at lowest cost. Simply stopping purchases is the easiest road into hard times.

"We've all become sloppy in our work: purchasing agents, engineers, salesmen, and designers. Let's get to work and do a job."

"However, don't get the idea that business is the only segment of our economic system that needs to roll up its sleeves. The government, labor, consumer and farmer must readjust themselves to the idea that business will continue good, employment high, if they look at the present in terms of the future and not the present in terms of the past."

William F. Schleicher



Shorten the time between purchase and profit

With break-even points going higher and higher, your profit depends increasingly on the length of time between the day you order materials and the day your finished product is ready for delivery. Cutting the length of that all-important period will greatly influence the amount of general overhead that must be charged against your selling price.

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New Engine Lathe

SLASHES MACHINING TIME ON STEEL MILL ROLLS

Steel mill rolls can now be turned in two thirds of the time previously consumed. Carbide tools are used with speeds up to 110 surface feet per minute. A tracer control is used, thus eliminating hundreds of form tools now being used. It is estimated only six or eight turning tools are necessary to cover all of the shapes required in any one roll shop.

AN ENGINE lathe which is likely to revolutionize the turning of steel mill rolls has been announced by The Monarch Machine Tool Co. The lathe, as demonstrated, promises to cut by two-thirds, or more, the present machining time on even the toughest chilled cast iron rolls.

The lathe is tracer-controlled, utilizing refinements in Monarch-Keller electrical contouring controls. Standard carbide tools are used with speeds as high as 110 surface feet per minute, the contour of the roll being controlled by a tracer unit which operates both carriage and tool slide feed through the medium of magnetic clutches.

Since the contour of the roll is template-controlled, the hundreds of form tools required with the present conventional method of roll turning will no longer be needed. Instead, a round carbide tool will be used to produce literally thousands of different shapes in the roll. As long as the radius on the tool is smaller than the radius or radii required on the roll, the same tool can be used.

According to Monarch engineers, the insert-type of carbide tool has proved most satisfactory, using a

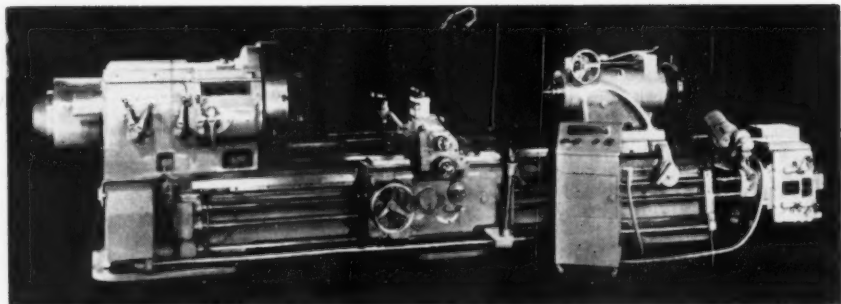


Fig. 1. The Monarch 32" lathe for turning steel mill rolls. The lathe is equipped with Monarch-Keeler electrical contouring controls. It will be built in two sizes, with production already started on the smaller, or 32" machine. The 60" machine, designed to handle the largest rolls used in the steel industry, will be put into production later in the year.

perfectly cylindrical carbide tip, mounted vertically. Nor is it necessary to have tools ground especially for individual contours since the template through its electrical control causes the round tool to reproduce accurately the shape required.

Where thousands of tools are now stored away, probably six or eight turning tools will cover all of the shapes required in any one roll shop, it is estimated. While a template is required for every roll, here again there will be a large saving because whatever shape is required or whenever a roll needs to be re-cut, the template previously prepared will duplicate exactly the contour originally specified. Moreover, the possibility of the operator inadvertently modifying the shape of the contour is completely eliminated.

In operation, the Keller unit with which the lathe is equipped get its longitudinal feed to the carriage by means of the leadscrew and its cross travel to the tool slide by means of the cross-feed screw. In this particular respect the Keller control differs from nearly every other type of contour control and is particularly applicable to roll turning.

Headstock of the new lathe has two drives, 16 fast speeds for carbide turn-

ing with single point tool, and eight slower face plate drive speeds for form tooling some shapes, if necessary. Spindle speed range is from $2\frac{1}{2}$ to 505 rpm which gives the flexibility required to apply the exact surface cutting speed best suited for the diameter or roll. The headstock has no gear box or end gearing since all feeds are electrically controlled.

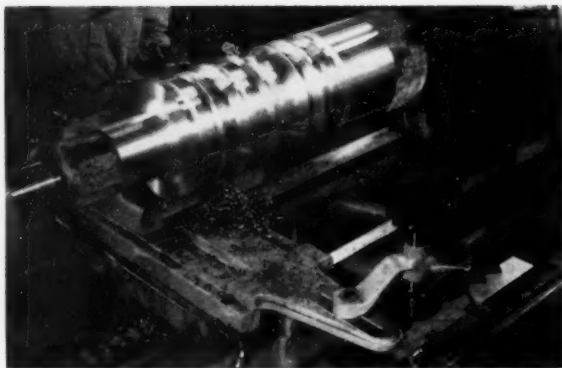
The specially-designed tailstock, sufficiently massive that heavy cuts can be taken either to left or right, is of the rotating spindle type with a sleeve mounted in anti-friction bearings as large as those used in the headstock spindle itself. Inside the sleeve is a solid movable quill, backed up by a heavy screw with a large capstan hand-wheel for final tightening. Auxiliary means for moving the spindle in and out is provided in the front end of the tailstock.

The carriage of the new lathe has been built for extremely heavy-duty with hardened cross feed screws and cross slide designed specially for roll turning tool pressures.

Separate control can be provided at the apron of the lathe for varying the speed of the direct current drive motor to give any spindle speed desired.

Connected to the tailstock end of

Fig. 2. Standard carbide turning tools are used at speeds as high as 110 surface feet per minute. Contour of the roll is controlled by a tracer unit (shown in immediate foreground) which operates both carriage and tool slide feed through the medium of magnetic clutches.



the new machine are the Keller controls, with an added rapid traverse mechanism which permits the operator to inch the cutting tool into position or to move it quickly from one end of the roll to the other.

Both longitudinal and transverse tracer-controlled tool motions are screw operated for positive feeding motions. As a result the enormous tool pressures ordinarily involved can have no effect upon the accuracy of the contour being machined. Rolls are turned on centers, thus permitting necks to be turned at the same setting. Necks may be redressed if not concentric during redressing operations. Since rolls are turned on centers, loading and unloading the machine can be

done more quickly than if neck supports are used.

Both headstock and tailstock centers are of the rotating type, therefore no wear to the centers in the rolls will take place. The centers are removable, individual company standard angles of centers may be used. Face plate jaws for either a three or four spline wobbler may be had for driving the rolls. Standardized tool grinds may also be adopted, making it possible to change tools at will and still machine accurate contours.

When redressing rolls the operator can quickly set the template with reference to the part and check that portion of the roll which has the greatest wear, thereby being sure that the en-

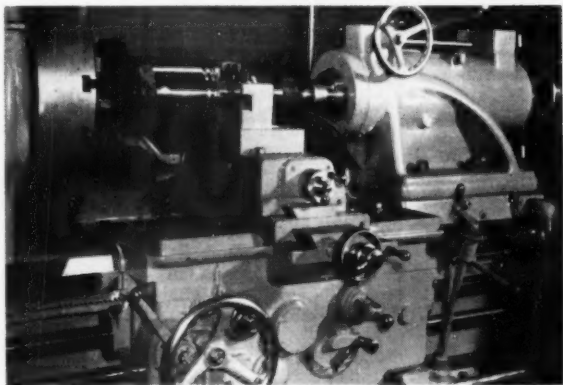
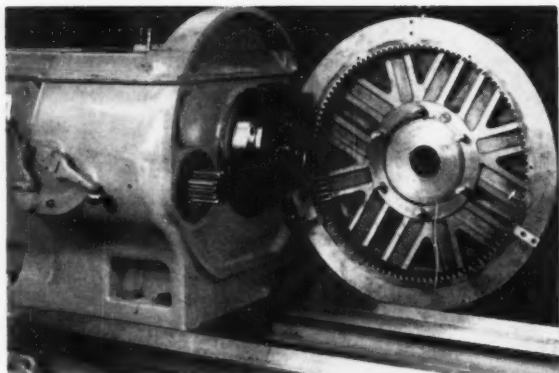


Fig. 3. Close-up of carriage and apron. Both longitudinal and transverse tracer-controlled tool motions are screw-operated for positive feeding motions. As a result, the enormous tool pressures ordinarily involved can have no effect upon the accuracy of the contour being machined.

Fig. 4. The Face plate headstock showing internal gear and pinion drive for slow speed forming operations. The headstock has two drives, 16 fast speeds for carbide turning with single point tool, and 8 slower face plate drive speeds for form tooling some shapes, if necessary.



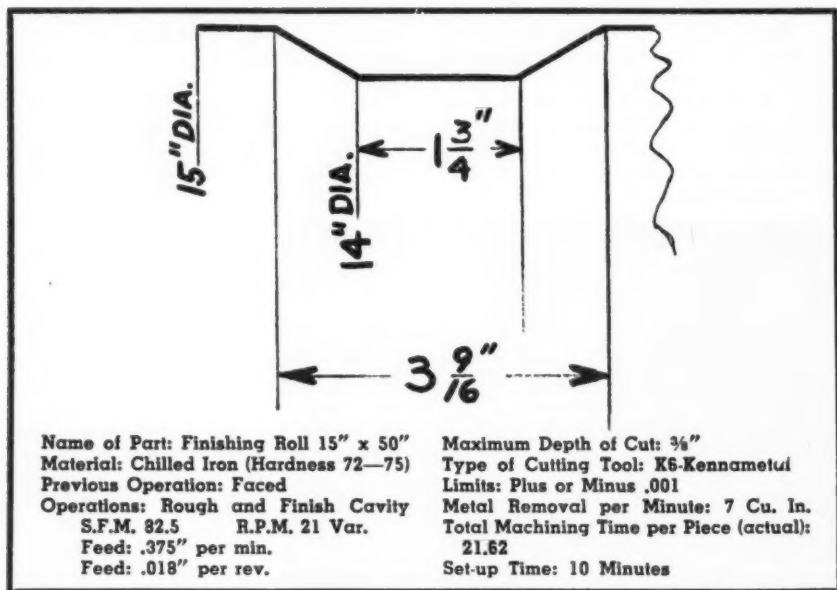
tire roll will clean up at the first pass.

Part of the electrical contour control is from a movable push button station to enable the operator to have control of roughing, finishing and contouring at his finger tips.

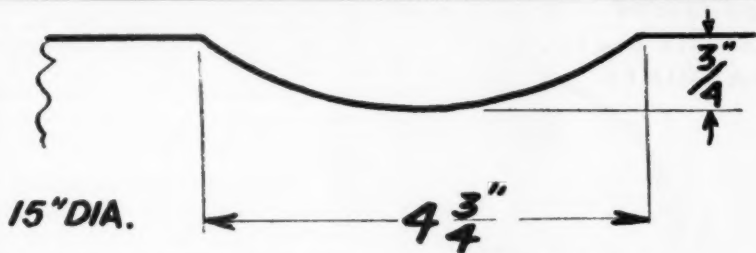
It has been found satisfactory to po-

sition rolls up to 24 inches in diameter on centers on the new machine. Neck supports used on conventional roll lathes are not needed because the tool pressures are not nearly so great. In some mills this means an additional saving with the new lathes since with the

Performance Data of the New Lathe



Performance Data of the New Lathe



Name of Part: Finishing Roll 15" x 50"

Material: Chilled Iron (Hardness 72.75)

Previous Operation: Faced

Operations: Rough and Finish Pass

Rough: S.F.M.: 110 R.P.M.: 28

Finish: S.F.M.: 110 R.P.M.: 28

Rough: Feed: .500 Long.

Finish: Feed: .250 Trans.

Maximum Depth of Cut: $\frac{3}{4}$ "

Type of Cutting Tool: K6 Kennametal

Limits: Plus or minus .001

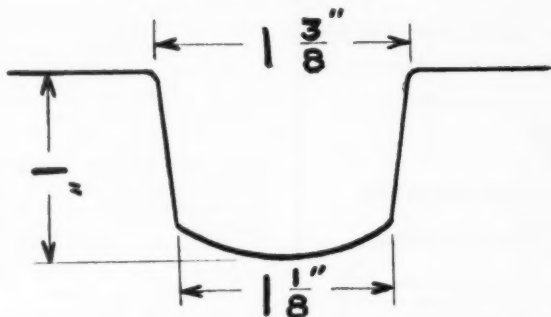
Metal Removed per Minute: 15 Cu. In.

Total Roughing Time per Piece (actual):

16 min.

Total Finishing Time per Piece (actual):

16 min.



Name of Part: Finishing Roll 13 1/2" x 28"

Material: Chilled Iron (Hardness 63-64)

Previous Operation: Faced

Operations: Rough and Finish Pass

Rough: S.F.M.: 130 R.P.M.: 36

Finish: S.F.M.: 130 R.P.M.: 36

Finish: Feed: .375" to .750"

Rough: Feed: .375" to .750"

Type of Cutting Tool: K6 Kennametal

Limits: Plus or Minus .001

Metal Removal per Min: 10.5 Cu. In.

Rotal Roughing Time per Piece (actual)

16 min.

Total Roughing Time per Piece (actual)

10.5 min.

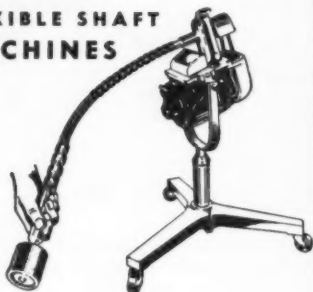
standardized center and counter bore, the centers retain their accuracy with reference to the roll. In some instances it has been also found that the necks can be machined to renew concentricity between the neck and form with-

out re-cutting the form on the roll.

In roll shops where the standardized center has not been adopted, centers of other than 70-degree-angle can be used in the new machine because both headstock and tailstock centers are re-

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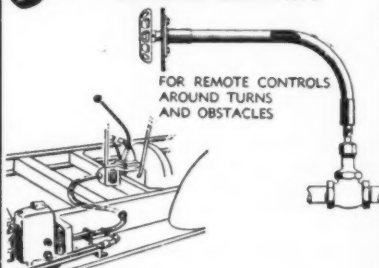


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movable. On rolls up to 24 inches in diameter, it is generally necessary to rotate the roll on centers because of the higher speeds used with the new contour control method of machining and because the tool is going to be accurately controlled from a template whose alignment is always perfect with reference to the center line of the machine.

An additional saving found with the template control of the new lathe comes from the fact that rolls can be machined without reference to pairs. The length of the body of the roll and the timing of the form with reference to the template. Therefore, two or three or a dozen top rolls can be machined with the same form, if desired; then followed immediately by an equal number of bottom rolls which when applied in the mill will have perfect alignment. In much the same fashion, one of a pair of rolls can be removed for redresing without requiring that the other be brought to the machine for matching. **THE END.**

Drill Jigs, Fixture Clamps, and Fixture Details are described in 150 pages. Catalog is divided into five sections and includes spring jigs, rack and pinion jigs, rapid clamps, fixture details, and patented fixture racks. Products, well illustrated, are shown in use. Siewek is the only manufacturer of standard drill jigs with both the spring type and rack and pinion type drill jigs. **Siewek Tool Co., 2864 E. Grand Blvd., Detroit, Mich.**

* * *

Drop Forgings are discussed in detail in "Metal Quality," 60 pages of reference data and design information. Illustrated is the development of metal quality progressively throughout hot working operations, from the blast furnace to the finished forging. Also discussed: forging quality steel, proper selection of steel, making forging dies, various methods of working steel. **Drop Forging Association, 605 Hanna Bldg., Cleveland, 15, O.**



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Because Moto-Tool is small it is easy to handle. It can save you hours by speeding up work now being tediously done by hand. Use Moto-Tool for light finishing operations, touching up dies (without tearing down "set-ups"), sharpening tools, etc. Moto-Tool proved itself during the war in plants as G.E., Westinghouse, Ford and others . . . also used by the Armed Forces. Has sturdy, shockproof bakelite housing with "pencil-type" finger grip • Instant-action, wrenchless chuck • dust-filtered air-cooling system • Oil-less (sealed) bearing • Over-size armature shaft, hardened, ground and polished • 110 V., universal type (A.C.-D.C.) motor • Weighs only 13 oz • Dynamically balanced for vibrationless operation.

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WITH 23 ACCESSORIES
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Moto-Tool Kit No. 2, with 23 accessories (high speed steel cutters, grinding wheels, polishing accessories) and heavy-duty Model 2 Moto-Tool in natural finish, hardwood case . . . \$23.50. (Items purchased separately would cost about \$30.00; you save \$6.50).

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INVENTORS TO HOLD INTERNATIONAL EXPOSITION

The First International Inventors Exposition, sponsored by the American Inventors Association, a non-profit organization, will be held in Grand Central Palace, New York, June 4 to 11, 1949.

The main purpose of the sponsors is to provide an opportunity for individual inventors, particularly, to be able to sample public opinion and at the same time show their products to industrial leaders. The Show Committee will screen all applications so that only products with unusual merit and promise will be al-

lowed to be exhibited.

As G. A. Parsons, managing director of the exposition states, "Special consideration will be given to inventions that create new jobs. Inventions generally create more employment than they take away; as evidence of this, the plastic industry has created new jobs supplying products to every phase of our existence;—the airplane industry with its safety devices, its radar, landing equipment, fog dispersers, etc."

One of the main purposes of this exposition is to encourage inventors. To that end, even though the Committee should not accept the invention for exhibition, a Guidance Council of accredited scientists will give free advice to embryo inventors. With full knowledge of the fact that one-third of every dollar of the national income goes to maintain our international leadership, the keynote of this exhibition is —

Defence and Prosperity is everybodys' job to stimulate our economy. In short, progress for America."

The facilities of the exhibition hall will be allocated to approved applicants who will be furnished private booths for their inventions at a minimum of cost (\$50.00 regardless of extent of space required — plus membership in A.I.A.). Corporations exhibiting new products will be charged the usual rates.

The exhibits will be departmentalized, to assist persons in locating their special interests.

FUNDAMENTAL PRINCIPLES

of Drawing Dies



by C. W. Hinman,
Designing Engineer

In this, the last of three articles on drawing dies, Mr. Hinman discusses press design, methods to be followed in designing a double-action die, and the operation of the die.

VARIOUS press designs are used for blanking and drawing shells and pans. Drawing presses must necessarily have a longer stroke of the ram than used for blanking dies. The action of the press ram for drawing and redrawing are of three general types, and are operated mechanically or hydraulically. The three types can be briefly described as follows.

1. In general, with single-action mechanical presses the ram is usually operated by a crank which has a long stroke. A punch is attached to the ram, which in descent, cuts a blank into a die, and continuing to descend, pulls the blank from under a spring-pad blankholder and draws it into a die to form a shell.

2. In double-action drawing presses there are two rams and one of them operates within the other. By way of illustration, it might be said that the two rams are arranged to work telescopically. The outer ram brings down a blankholder in the die, which in mechanical presses is usually operated by toggle-links, as seen in the photograph, Fig. 3. The blankholder ram descends first, and its attached die member may be used to cut a blank or to hold one down with

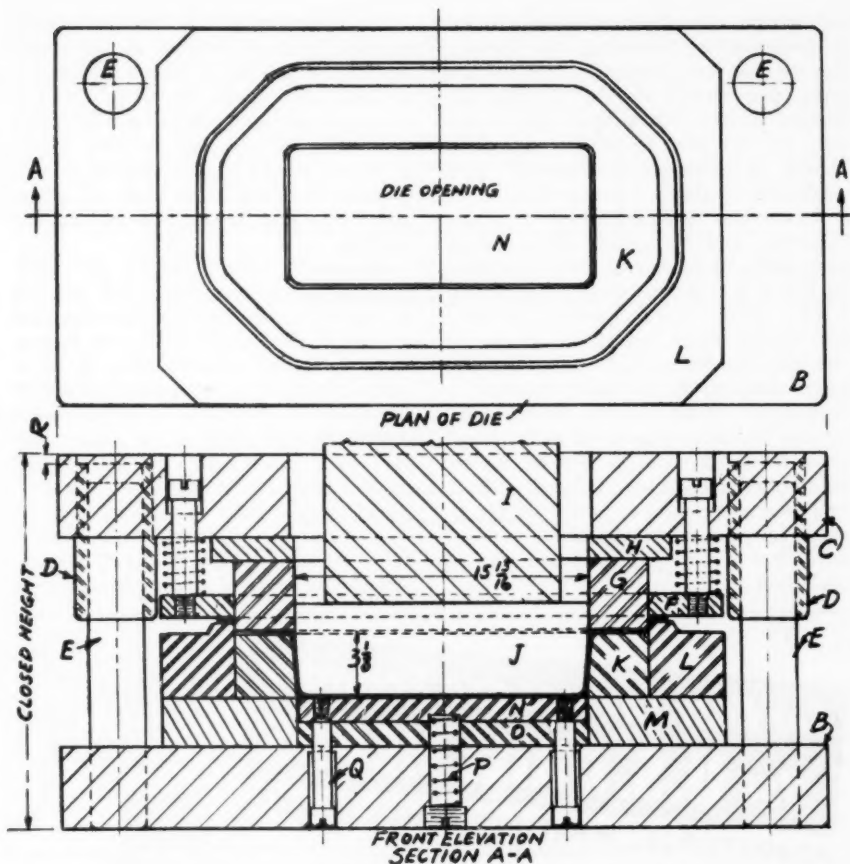


Fig. 1. A double-action blanking and drawing die for producing the first draw of the aluminum alloy pan sketched in Fig. 2. This press tool is designed for use in the toggle drawing press seen in Fig. 3.

• • •

suitable pressure, while the inner ram follows in descent with a drawing punch that pulls the blank out from under its blankholder and down into the die, thus drawing a shell whose size and shape is the same as the punch itself.

3. In triple-action presses the operations are practically identical with those of the double-action types, but in addition they employ a third independent

ram that operates another punch upward through the bed of the press. This third punch may indent, stamp, shear through, emboss, or otherwise operate on the bottom of a shell that has been drawn down into the die by the double-action equipment.

Designing a Double-Action Die

Figure 1 presents the usual mechani-

cal design and drafting technique for a double-action blanking and drawing die for the first draw of an aluminum alloy pan shown in Fig. 2. This die blanks, draws, forms, and spans the pan to size and shape in one press stroke. It therefore furnishes a very profitable method of production.

A sort-cut explanation of any tool drawing, and its construction design, is to name its parts and their functions. In Fig. 1, **B** is the die shoe; **C** the punch holder which is attached to the outer ram of the press, commonly known as the blankholder ram. **D** are two guide post bushings; **E** two guide posts; **F** a spring-pad stripper plate which surrounds blanking punch **G**. **G** is a tool steel blanking punch backed up by cold-rolled steel plate **H**, and both **G** and **H** are attached to punch holder **C**. Back up plates are an economy measure that avoids an excessive use of tool steel.

Tool member **I** is a cast-iron punch adapter attached between **J**, the drawing punch, and to the punch ram which is the inner ram of the press. **J** is the tool steel drawing punch and attached to **I**. **K** is the tool steel drawing die; **L** is a tool steel blanking die; **M** is another cold-rolled steel back up plate, and **K**, **L**, and **M** are attached on die shoe **B**.

Member **N** is an ejector pad that lifts the drawn pan from the die. It is operated by several compression springs **P** and controlled in its movement height by stripper bolts **Q**. **O** is a stop-plate, or "bumper plate" which is contacted by **N** at the extreme down stroke. **R** represents an oil pocket, one over each guide post. The oil pockets serve to maintain a supply of lubricating oil in the guide bushings, because on the extreme upstroke of the blankholder ram, to which **D** and **C** are attached, the ends of the guide posts do

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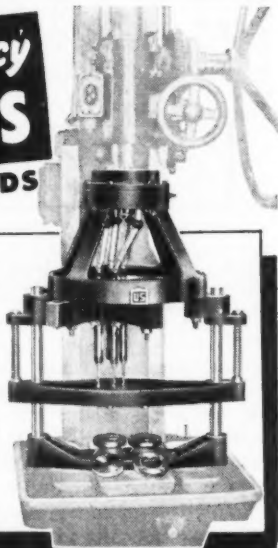
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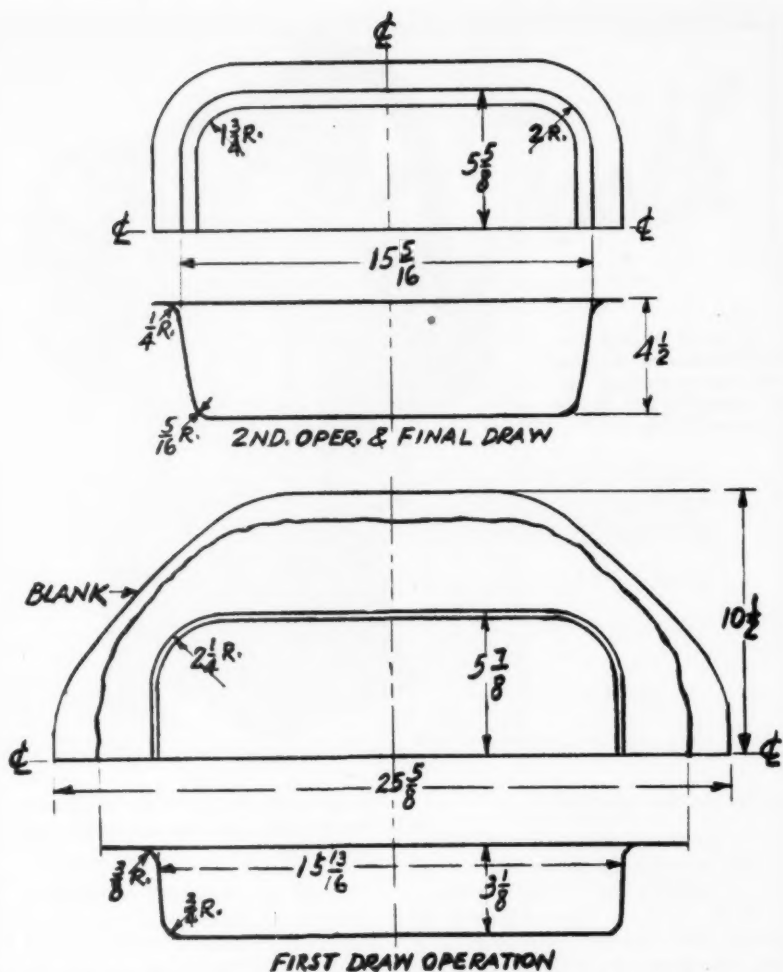


Fig. 2. Typical first operation blank and draw, and the final redrawing operation in double-action dies, for producing a rectangular aluminum alloy pan.

not leave their bushings, and the oil cannot escape.

Operation of the Die

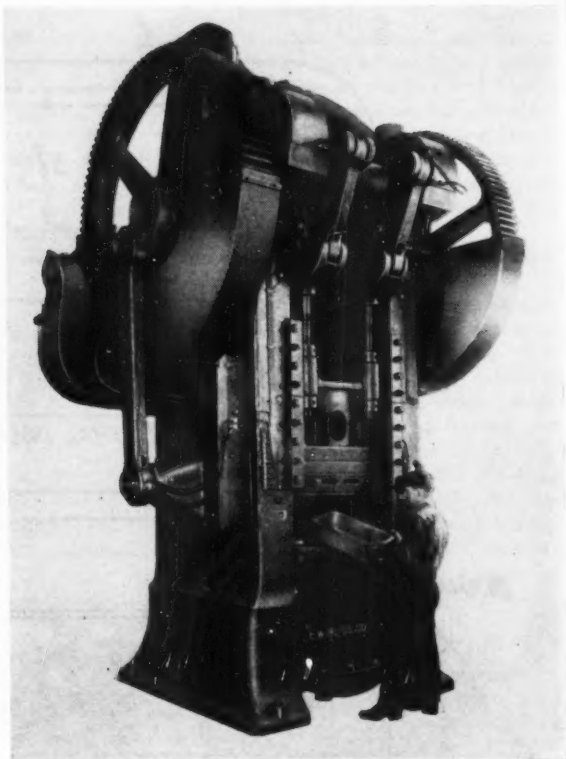
This press tool is fed from front to back. The tool is shown at its extreme

down stroke, and the cut scrap edges are shown under stripper plate **F** and lying on the face of blanking die **L**. On the upstroke, ejector pad **N** follows up under the drawn pan and leaves it standing on the pad, above the die, for

• • •

Fig. 3. An E. W. Bliss double-action drawing press set up to redraw a similar second operation pan as the one shown in Fig. 2.

• • •



removal by the operator.

Next, the scrap strip is fed against a stop pin, which engages an edge in the last cut opening, and a new area of the work strip is thus exposed for blanking and drawing another pan. When the press is "tripped" into action, the blankholder ram with punch holder C which carries blanking punch G, descends first and cuts a blank and holds it down on the face of drawing die K. Next, the inner ram descends and carries down drawing punch J which contacts the cut blank. The drawing punch then continues to descend and pulls the edges of the blank

from between G and K, and draws the blank down into the die and forms another pan.

In the tool drawing, notice that the sides of the drawing die have a slight taper. This feature tends to avoid tool scratches on the work and is also an aid toward an easy ejection of the drawn pan.

Drawing dies commonly used for large parts of automotive or farm machinery parts, where a few scratches on the work is permissible, are constructed of fine grain cast-iron. There are several grades of alloyed cast irons in the market that will take a smoother

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New Hydraulic Duplicator Fits LeBlond Heavy Duty Lathes

The new LeBlond Hydra-Trace is sold as an attachment, and brings automatic duplicating to any LeBlond engine, tool room, Rapid Production, gap or hollow spindle lathe built since 1935. This productive new tracer is equally suited for between-centers duplicating or for profile facing. It's so simple and easy to mount and operate, you'll be using it continuously and profitably . . . because the Hydra-Trace will reduce to hours and minutes the tedious jobs that formerly took days to produce.

The LeBlond Hydra-Trace is a heavy duty duplicator and will produce with the same ease, speed and accuracy for which LeBlond lathes are so well known. And, since it's made with characteristic LeBlond care and skill, it will match the stamina and power of your LeBlond lathe.

The addition of the Hydra-Trace to your LeBlond lathes will increase their versatility and value many times over for a small initial investment. Another LeBlond "first," the Hydra-Trace will be first with you, too, when it comes to modern, efficient, automatic, low-cost tracing of repetitive work. For specifications on the sizes you need, write

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finish than ordinary cast-iron, such as Meehanite Metal which, after being cast and machine finished, will take a high polish. Cast-iron punches and dies are provided with grinding allowances, and are finally finished to templates by using hand grinders. Machinery steel drawing dies have been used for large dies. They can be carburized by pack case hardening them for long wear. All these materials can be used for drawing aluminum or for stainless steel alloys.

The lower view in Fig. 2 shows the blank development for drawing the first operation pan. The second and final redrawing operation is seen in the upper view. The final redraw is also performed in a double-action press. A sleeve is brought down by the blankholder ram and enters inside the pan. The contour shape of the sleeve fits the pan. A spring-pad blankholder surrounds the sleeve and holds down the rim around the pan. A redrawing punch, attached to the inner ram then descends through the sleeve and redraws the pan down into the die. In this way the shell is perfectly centralized over the die before redrawing begins. The pan cannot form wrinkles because the spring-pad blankholder holds down the rim around the pan, but permits it to slip into the die when the punch descends. The sleeve within the pan prevents side wrinkles.

Figure 3 shows a double-action toggle press that performs both of the die operations just described. It is set up for redrawing a similar pan of about the same size as those shown in Fig. 2.

This produces approximately 30 pans per hour when operated at its standard rate of $8\frac{1}{2}$ strokes per minute. The finished product is subsequently trimmed, wired, washed, and annealed if made from steel. **THE END.**

YOU'RE RIGHT! *It's wrong* FOR SPINDLES



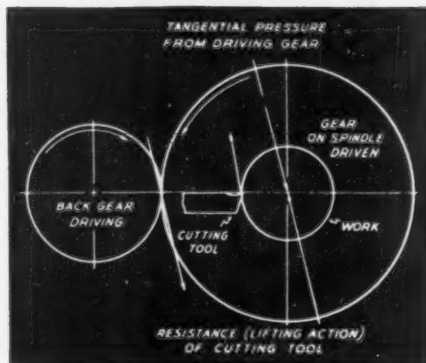
When section hands want to "poosh 'em up" they get a lever on both sides of a rail and "alley oop" she comes.

But pooshing up a lathe spindle with an upthrusting cutting tool at the front and an upthrusting back gear at the back is obviously and eternally wrong as a hailstorm, even if it has been, and still is done on every lathe made in the U. S. except one . . . that one is Boye & Emmes.

Wrong because it promotes spindle whip. Wrong because it promotes chatter. Wrong because it slows down the job. Wrong because it's unnecessary. You can buy a lathe that has the back gear at the front, thrusting down on the spindle, and counteracting the upthrust of the tool, stopping whip and chatter and giving smoother, faster production.

This engine lathe breaks away from tradition, and convention, and embodies engineering imagination in many other improvements equally obvious, and equally well supported by test and experience.

Fortunately, you can buy this lathe right now in all sizes from 14" to 32". You don't have to wait for the September Tool Show to see something



The B & E lathe is the only one in the U. S. which has the backgear at the front, counteracting the upthrust of the tool.

better than you've been using. But if some lathe should finally catch up with the B & E in respect to putting the back gear in front it might be well to remember that the lathe that pioneered this great improvement and has pioneered so many in the last fifty years will pioneer the next sensation.

Does B & E think it's pretty good? Is it worth your while to learn more about this lathe of surpassing craftsmanship? Definitely. Write for booklet #60 . . . see how engineering skill and experience combine to produce this great improvement in lathe design.

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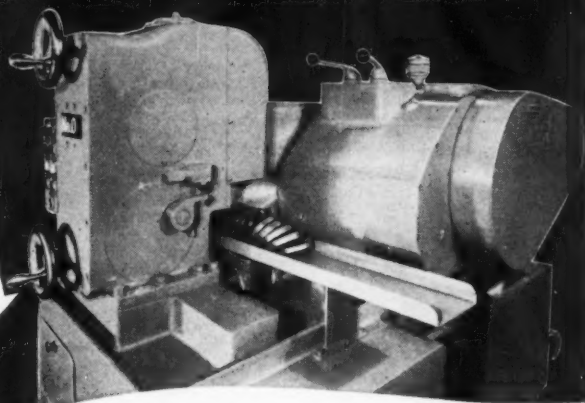
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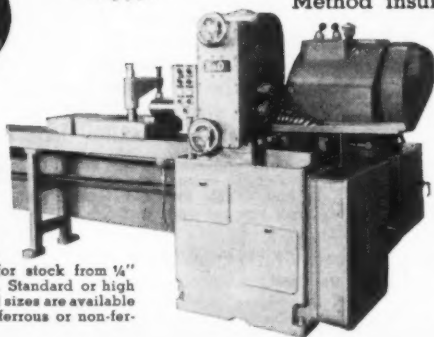


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Letter from England



Written for the **MACHINE** and **TOOL BLUE BOOK** by Robert Hutcheson, Editor of **MACHINE SHOP MAGAZINE**, London, England.



Interesting indications of the general levelling out of wage rates have been revealed by the recently published White Paper on National Income and Expenditure of the United Kingdom 1946-1948. The nation's gross national income in 1948 was £9, 675, 000, 000 (38, 700, 000 dollars). This figure represents a rise of eleven per cent over 1947 and is almost double the national income for 1938. Wages for manual workers took forty-one per cent of the national income. This represented a twelve-and-a-half per cent increase over the 1938 figures, whereas salaries showed only an increase of six per cent over 1938. Personal expenditure rose by seven per cent in money terms during 1948 but the percentage rises in the cost of living exactly equalled this. The individual consumer's share of the goods and services produced fell appreciably. These are estimated to be three per cent greater than in 1938, but the population has risen five per cent, indicating a decrease in consumption per head.

The average weekly earnings of some men in manufacturing industries were exactly doubled between October 1938 and October of last year. The average percentages increase for all workers in these industries, including boys, girls and women, was 120 per cent.

The months of March and April this year were not greatly marred by any major

industrial unrest. Most of the strikes and stoppages took place in the transportation and goods handling industries. Some of the stoppages were rather interesting because of the reasons, strange in many cases, which brought them about. For instance, 1,700 strikers at a textile machinery works at Manchester decided to return to work before negotiations were opened between the management and the strike committee. The strike was set in motion when 300 men were laid off because of redundancy. The strikers objected and all work was stopped. The morning after the dismissal notices were issued, the workers at the factory reported at their usual time because they believed that the dismissals were unnecessary. In short, they refused to be fired. The reasons given for the firm's action were cancellation of contracts and a fire in a drying room and paint shop. Another unusual strike was caused at a street car repair works. The dispute arose from the upgrading of unskilled labour to the status of semi-skilled. After the upgrading, the Electrical Trades Union wanted to claim the men as members of their union and shift them from the Transport and General Workers' Union, to which they belonged. The last named union argues that men should not be compelled to move from one union to another. On this case the employers, the London Transport Executive, just sat on the fence and did nothing about it.

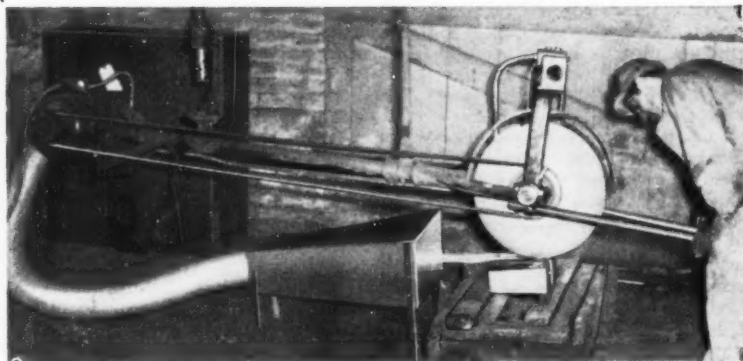
Mechanisation of processes formerly done by hand are resisted all the way, particularly in the fields of mechanical handling. Two giant high-capacity ore unloaders at the steelworks of Dorman Long & Company recently started work after being idle for six weeks. The stoppage was caused by a dispute over the number of hands to be employed on the unloaders. The company argues that each of the giant grabs which can lift 350 tons of ore an hour out of a ship's hold can be controlled by a single crane man. The union claimed that each grab should have four men in the hold of the ship and a tipper on the dockside. The matter was finally referred to a court of arbitration which decided that the machines should be operated with two observers and the tipper in attendance for an experimental period of one month, after which the position would be reviewed by both sides in the light of the experience gained. A similar argument about mechanical handling arose over the discharge of sugar from ship's holds. Mechanical grabs were to be used for unloading the sugar instead of man-han-

dling it in bag form. This dispute, however, was settled in a fairly reasonable manner, the union agreeing to a wage equal to the pay of thirteen men to be divided among eight, but the eight men will now unload 1,000 tons of bulk sugar, whereas the former thirteen men could only discharge 300 tons for the same wage expenditure. Thus, the handling cost has been reduced from about 45 cents a ton to less than ten cents.

There are fewer unemployed in this country at the present time, but the total working population fell during February by 20,000. This was made up of 14,000 men and 6,000 women. Changes in the employment figures for industries showed increases in textiles, clothing, chemicals, gas, water and electricity. A decline in employment figures took place in transport, metals, engineering and vehicles, food, drink and tobacco and building. The total unemployed in the country on March 14th was 340,406. The workless include 42,203 married women and 6,478 ex-service personnel who have not been employed

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since leaving the armed forces. Despite intensive development by the government placing of industries, Wales still has the highest percentage rate of unemployment, 4.2, against the average for Britain of 1.7. Mr. Isaacs, Minister of Labour, recently stated, "There is still a reluctance on the part of employers to take men over 45, those aged about 55 provide the biggest problem. Employers really must be prepared to take some of these men, or later on they may not be able to get just the age groups they want."

The only reports appearing in the British press about the activities of the British steel foundry workers who visited America recently have appeared in the tabloid Daily Mirror. The general impression gained from the rather highly emotional articles we have read over here is that the price the American worker has to pay in monotony for his higher standard of living raises no envy in the breasts of the British workers who visited their factories. The British visitors appear to have been deeply shocked at the intensity of the pace practiced in American plants. This, coupled

with the tremendously higher living costs, the fear of the Communist bogey and the general atmosphere of insecurity should make their report very interesting to all of us over here.

The members of the United Kingdom section of the Anglo-American Council on Productivity have also been visiting your country, where they met and had discussions with the American section of the Council. They visited a number of your industrial towns and are publishing their report, and a press conference at which their findings will be made public is being held.

The recent record set up by a stock model British automobile at Indianapolis has given a boost to the morale of the British automobile industry. The position now is that if our automobile plants cannot maintain an export figure to dollar countries of seventy five per cent of their output, then their quota of steel supplies will be cut. A slight concession to enable production to be gauged on a yearly basis instead of quarterly has been made by the



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Minister of Supply. This will result in the twenty-five per cent allowance of automobile production for the home market being more smoothly and evenly distributed. The urge to earn dollars by selling British automobiles has resulted in the production of bigger cars with high powered engines. Body styling has also been modified, the trend being towards the more voluptuous curves preferred by the dollar countries. The twenty-five per cent price cut in the Austin Atlantic car came as a surprise to many sections of the British industry. Some old established firms here are unable to produce their cars economically at prices that would be acceptable to even the American "carriage trade". There is no doubt that the Austin firm have been able to bring about the price reduction since they claim seventy-five per cent of the total sales of British automobiles in the United States during the past twelve months.

New plans to capture a bigger share of North American markets for British prod-

ucts were announced in the House of Commons recently by Mr. Wilson, President of the Board of Trade. Their object is to raise the rate of exports to Canada and the United States from the 1948 figure of £136,000,000 (544,000,000 dollars) to £180,000,000 (720,000,000 dollars) by 1950. This is intended as a step towards balancing our accounts with North America by the time Marshall Aid runs out. Among the eight points of the programme for exporters to these markets is that of help, and in some cases, open favouritism in appropriating and allocating raw material. Another point is the provision of Government assistance for market research beyond the American east coast and energetic publicity. Mr. Wilson said recently, "Enormous areas of North America have never been touched by British products and we are now trying to get in there. The problem is much more a question of selling than one of prices." It was planned as part of this drive to appoint three trade advisers in the United States, but after six weeks of enquiries no applicants have come forward for the jobs, maybe the salary of 10,000 dollars a year plus expenses is not sufficient inducement to attract the required younger executives from leading industrial and commercial concerns. Meanwhile, the Foreign Office is to place at the disposal of the export drive four of its senior officials. These officials will be known as superintending trade consuls and their work will be wholly devoted to trade matters.

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HOUGHTON ENTERTAINS EMPLOYEES AND FAMILIES

More than 800 employees and members of their families attended the recent family week Open House program of E. F. Houghton & Co., manufacturer of industrial chemicals, oils and leathers. The program featured three evenings of visitation at the company's modern office building at 303 W. Lehigh Ave., Philadelphia. The visitors inspected an entire floor of exhibits featuring Houghton products and the finished products of leading Philadelphia industries using Houghton materials.

SNYDER TOOL ENGINEERING BUYS COLTON COMPANY

Two pioneer Detroit firms were combined recently when Snyder Tool & Engineering Co., builder of production machines for the automotive and similar industries purchased Arthur Colton Co., builder of production machines for the drug, plastics and packaging industries. The deal was negotiated by Detroit Trust Company.

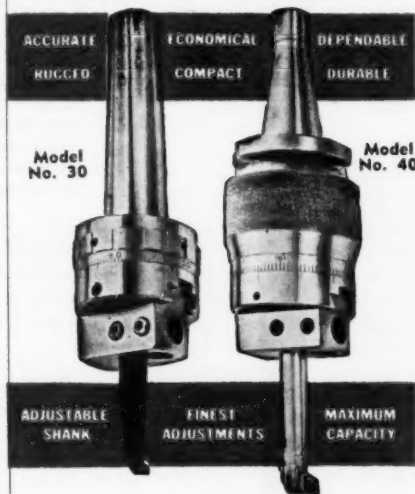
Snyder Tool & Engineering Company was founded in 1925 by Clarence Snyder who came to Detroit in the early days of the automotive industry and was one of the first to suggest the use of specialized machines in the production of precision automobile parts at low cost — a theory long since accepted by many other industries as well. Snyder got into the young automotive industry and almost at once was given the assignment of finding and bringing to Detroit the cream of the nation's machinist man-power, which he did. After fifteen years of association with leading car-builders he founded his own machine company and has seen it grow from a twelve-man operation a quarter century ago to a two-hundred-man organization occupying one of the most modern and efficient plants in the country. Clarence Snyder is now chairman of the board.

Arthur Colton arrived in Detroit in 1884 and, like Snyder, dedicated himself to the cause of the special-purpose machine and particularly such machines as called for fine workmanship and accuracy of operation. He organized his own business and quickly established the reputation for excellent craftsmanship and mechanical ingenuity which was inseparably linked with his name throughout his business career. Colton set about developing a line of pharmaceutical manufacturing and packaging machines which grew to be the largest exclusive drug and cosmetic machinery business in the world. Howard N. Maynard, president of Snyder Tool & Engineering Company announced that manufacturing operations will be transferred to the modern Snyder plant but the new subsidiary will continue to operate under the time-honored name of Arthur Colton Company.

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Arc Welding a

HOUSING CASE FOR HYDRAULIC DRIVE

by George Pheil,

Engineer, Twin Disc Clutch Co.

The unit weighs 650 lbs. and is fabricated at a cost of \$347 in lots of three, including boring and facing operations. Arc welding was used as a means for achieving a structural design which meets functional requirements at lowest cost.

AN INTERESTING adaptation of arc welding was applied to fabricate a housing case used with a new multiple engine hydraulic drive for marine service by the Twin Disc Clutch Co., Racine, Wis.

The Twin Disc multiple engine drive is a simply designed, compact assembly. It consists of a hydraulically actuated ME-301 Twin Disc marine gear which is attached to an arc welded chain case. The case is assembled on the flywheel end of the engines. Within the fabricated arc welded steel housing of the case are two hydraulic couplings which tie the engines together and transmit the power to the marine gear by means of a chain drive.

The electric arc welded housing is fabricated for a cost of \$347.00 each in lots of three, including machining operations of boring and facing, leaving only the drilling and tapping for completion. The design blends into the general appearance of the mating units and affords the maximum saving in manufacturing cost, weight reduction, space and flexible adaptations in installations. The unit weighs only 650 lbs.

The case, structurally, is strong and rigid, enabling

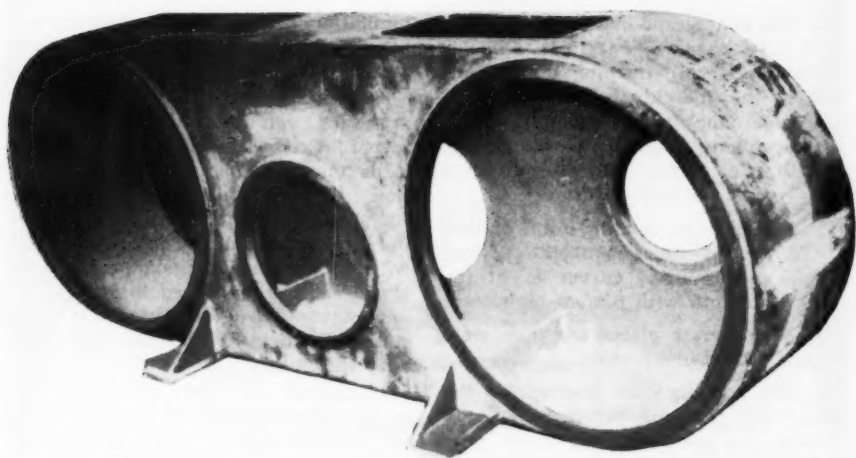


Fig. 1. View of the housing case. The unit is $81\frac{1}{4}$ " long, $15\frac{1}{2}$ " wide, 30" high. (These figures are approximate). About 150' total weld is used on each housing

the welding, machining, handling and installation to be done without distortion. Stiffener ribs are strategically placed for added strength.

To resist deflection, the structure is made heavy enough to withstand high loading without perceptible deformation. Since deflection is mainly a function of the section modulus, welding done in the horizontal transverse neutral axis has very little effect upon rigidity. To resist fatigue and impact, 100 per cent weld penetration is accomplished using a vee'd joint at the rate of approximately 10 feet of joint per hour.

To minimize the amount of welding required, bending and forming was adopted where feasible and economical. Set-up jigs are used to lessen welding interruptions and to cut labor costs.

Work positioners were used and large size electrodes to get maximum deposit rates for lowest cost and quality results.

The selection of the electric arc welded design for this case was not primarily as a substitute for some other method of fabricating, but rather as a means of achieving a structural design that will meet its functional requirements most advantageously and at a minimum cost. Welding was done for Twin Disc by the Lakeside Bridge and steel Co.

The chain housing under goes twelve distinct stages of processing:

1. Certified prints are received in the engineering department where detailed information covering all phases of development is listed for the shop to follow

2. The template department transcribes this data on gray template paper into the forms, shaped so as to serve as a guide in making each component part with a corresponding contour.

3. Layouts are then made on the steel plates in the shape and cutouts as detailed.

4. The pantograph machine flame cuts with a $\frac{1}{8}$ " swath the steel plates as per template design. Burning and shearing of the individual pieces of SAE 1020 steel stock with a No. "O" tip by oxy-acetylene torch is followed by the bevelling of certain edges requiring a 60° V scarf for butt welding.

5. A Cincinnati bending brake is used to form at 1" increments the desired shape and radiused curves to fit the wood template with perfect technique.

6. All separate pieces are then weld fit and tacked into position.

7. The housing then proceeds to the weld shop turntable which is a heavy fixture and positioning jig which simplifies assembly and assures maximum speed by downhand welding. Approximately 150' total weld is used on each housing, using a $3/16$ " flux-coated electrode. All fillet welds are continuous. The "V" butt welding is done with a

minimum convexity and faces are blended smoothly into the plate surfaces.

8. Stress relieving takes place in an annealing oven after all welding is completed. A temperature of 1150° to 1200° F. is maintained for $1\frac{1}{4}$ hrs. soaking time. The temperature is lowered to 200° — 250° F., and then allowed to cool in room temperature. The oven is fitted with a "Brown Potentiometer", which gives readings graduated into time and temperature on graph paper at each station in the oven to assure a uniform heat at all positions.

9. Air and sand from a mixing tank is used for a wet sand blast to wash off rust and remove scale. A chemical in the water arrests possible rust or corrosion action.

10. The housing then proceeds to the grinding department for cleaning up.

11. The next operations are performed in the machine shop.

12. Final inspection. THE END.

* * *

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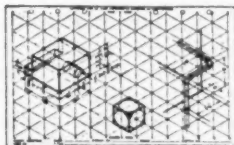
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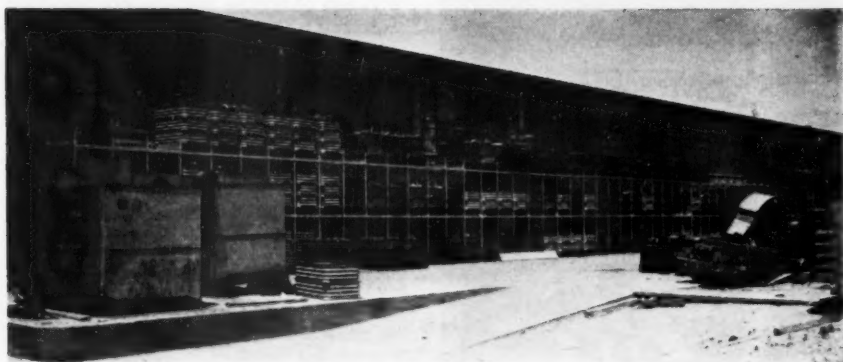
Motor Production Flowing Smoothly

Conveyors, lift trucks, pallets and skids combine to help new Reliance plant in Ashtabula, Ohio, attain high volume output at low unit cost. The plant was constructed around one fundamental consideration: efficient integration of time and labor-saving methods into a continuous production sequence.

THE OVERALL concept of efficient product-moving — from the time raw materials arrive in the plant until the finished product is delivered to the shipping platform — is being given increasingly close attention in designing new factories or modernizing old ones.

An interesting indication of the manner in which modern management is becoming more and more materials-handling conscious, may be found in the new Ashtabula, Ohio plant of The Reliance Electrical & Engineering Company, manufacturers of motors, generators, adjustable-speed (V-S) drives and related electrical equipment. Layout planning alone involved a three-month study of production flow requirements and their correlation with the demand for minimum handling of materials.

Design-wise, this plant, which provides a manufacturing area of 120,000 square feet, has been built primarily around one fundamental consideration: efficient integration of time-and-labor-saving methods into a continuous production sequence. By means of this key combination, the plant is geared for high-volume output at low unit cost. Approximately 2615 lineal feet



Outside storage area provided for castings and other parts is 200 feet by 30 feet.

of conveyors connecting various work stations, a fleet of three electric and one gas powered elevating type fork trucks, seven electric powered and ten hand type pallet trucks, skids and pallets numbering 2800 units, inside and outside skid and pallet storage — all are effectively combined as tools to achieve profitable production.

The manufacturing layout comprises three functionally parallel processing lines. Into each line materials are funnelled from an ample, centrally-situated storage area.

One line feeds the Fabricating Department, which converts sheet steel, plate and bar stock into stator, rotor and armature laminations and weldments. A second line serves the Machine Shop, where bar stock weldments and castings are machined into finished motor components. The third line carries wire, insulating materials and a certain percentage of machined parts through a winding room where they are processed into motor armatures, fields, rotors and stators.

Several shorter lines from supplementary operations feed into these three main manufacturing lines, which merge

to form the motor assembly line. Handling facilities and techniques, by moving materials and parts in a steady stream from storage areas into all fabrication channels, keep production flowing smoothly and at a uniformly high rate.

All incoming materials enter the building at the south end, where totally-enclosed rail and truck docks are located. Bar stock and sheet steel can be handled in carload lots since the railroad dock, 130 feet by 20 feet, accommodates two rail cars at a time. Rails are depressed in a concrete pit, putting the deck of a gondola, flat or box car at the same level as the plant floor. The dock is served by a 260-foot craneway equipped with a five-ton crane. Large shipments of outgoing products may also be handled here.

Similarly, the area for receiving truck shipments has been designed for maximum materials handling flexibility. Likewise totally enclosed for all-weather operation, it is 80 feet long, 40 feet wide, and 18 feet high, readily accommodating at one time three of the longest tractor-trailer combinations in general highway transportation use today.



Steel sheet and bar storage area, adjacent to the railroad dock, is served by a 260-foot craneway equipped with 5-ton crane.

Like the rail dock, this area is depressed, thereby enabling all materials to be unloaded or loaded directly at floor level onto lift trucks or pallets. A 54-foot crane with a three-ton crane provides adequate capacity for servicing this area.

Worthy of special note is an unusual feature in both receiving and shipping areas that further expedites unloading and loading of trucks. Two hydraulically-operated, pushbutton-controlled dock lifts, designed and developed by Reliance engineers, permit adjusting any truck bed through an 18" range to the level of the shipping and receiving dock floor.

Each lift is 10 feet by 15 feet and will handle axle loads up to 15,000 lbs. Thanks to the quick, convenient access

to floors of trucks and trailers resulting from the installation of these lifts, large unit loads can be readily palletized and handled with the plant transport equipment.

Separate Storage Area Serves

Each production line has its own storage area. Bar Stock and Sheet Metal Storage serves the Fabricating Department and Machine Shop, which also receives castings from an outdoor storage area 200 feet by 30 feet located along the east wall of the building. Storeroom "A", toward the north end of the plant, is used for finished assembly and miscellaneous parts. In Storeroom "B", adjacent to the Assembly Department, are stocked finished armatures and rotors for motors covered by special sales orders. Storeroom "C" in the southwest portion of the building furnishes stators, frames, shafts and other processed parts for the Winding Room, where insulation is applied, coils wound, armatures and stators impregnated by a special varnish dipping-and-baking process, and other manufacturing operations performed.

All materials upon receipt at the plant are checked for quantity, inspected and identified, then transferred either to indoor storage or outdoor storage. Bar and sheet stock is moved into storage directly by crane, while other materials are loaded onto pallets or skid platforms for transportation by fork lift trucks to the proper stockroom.

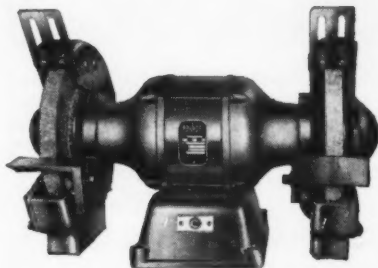
A clear-cut delineation of responsibility is a feature of the materials handling performance at the Reliance plant. The foreman of the Stores Department is responsible for movement of material from stock to point of production use. Each fabricating or processing department, in turn, takes care of moving material from one operation to another within its own particular area. Then, when processing of work by that department is completed, the Stores De-

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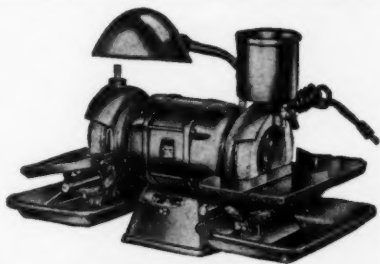
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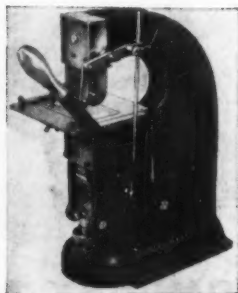
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Model 93

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and Stamping*

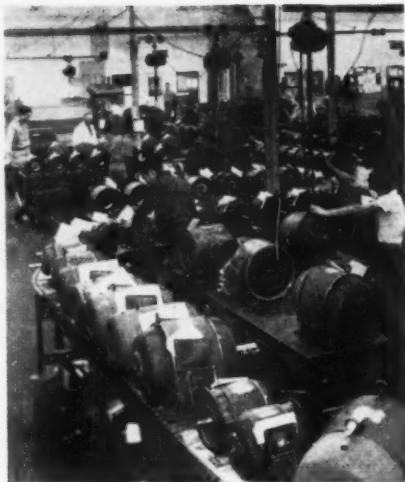
This press is principally made for use with our Automatic Numbering Head Model No. 50 for consecutive numbering. Stamps serial numbers on name plates, etc. Non-automatic numbering head and typeholders and steel type can also be used in this press. Press exerts a high pressure up to 10 tons. Head space adjustable.

Write for Bulletin BB93



Model No. 93

NUMBERALL STAMP & TOOL CO.
HUGUENOT PARK STATEN ISLAND 12, N. Y.



Use of jib cranes and electric motor-operated hoist simplifies handling of assembled motors which get last-minute check after testing and before being conveyed to painting and shipping departments.

* * * *

department which, again, supervises the partment moves the parts to the next movement of all material within its own area. Thus, inter-departmental transportation of materials is handled by the Stores Department, while intra-departmental movements are directed by each department itself.

Three different types of mobile equipment are used for handling castings, shafts, frames, baffles, covers, laminations, wire, insulation materials and miscellaneous items on metal skids and wooden pallets: (1) electric and gas powered elevating fork trucks of 4,000 lbs., 11-ft.-lift capacity; (2) electric pallet-type fork trucks of 4,000 lbs. capacity; and (3) hand-hydraulic pallet-type fork trucks of 4,000 lbs. capacity.

The two major storerooms—"A" and "C"—are equipped with steel racks on which 1,705 loaded skids and pallets

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SURFACE GRINDER

• Rugged, High Powered and Versatile, Mattison Precision Surface Grinders with double-column construction are built to handle your grinding jobs on a real production basis, providing repeated production results and a fine finish. They are built with table sizes from 18" to 36" wide by 24" to 192" long.

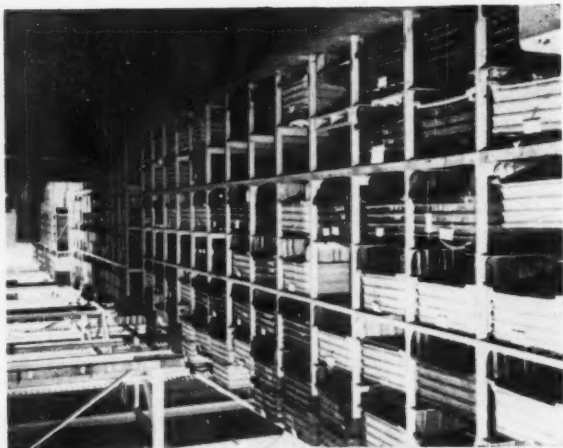
WIDE ABRASIVE BELT GRINDING AND POLISHING MACHINE

• From the time factory tested abrasives were introduced for metal polishing and grinding, Mattison have developed and built machines properly applying belts to the job to be done. The Wide-Belt Sheet Grinder and Finisher shown above is for finishing stainless steel and alloy steels in sizes up to six feet wide and fifteen feet long.

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• • •
 Finished assembly and miscellaneous parts are loaded on pallets and skids; moved to storage on steel racks by electric-powered fork lift trucks.
 • • •



may be stored. Of Reliance Electric's own design, these racks permit full use of "air rights" up to 15-foot clearance beneath the roof trusses, thereby assuring peak economy and optimum utilization of available floor space.

Roller Conveyors Speed Handling

Materials movements within each processing department are accomplished through the use of the fork-type pallet trucks or by gravity roller-type conveyors where particular processes lend themselves to the application of the latter equipment. The longest such line, containing a total of 1,066 feet of conveyor, serves the stator fabricating, machining, benching and inspection departments. Stators travel from one processing station to another, moving horizontally throughout this sequence.

Extensive use of gravity conveyors also is made in the plant's Winding Department. The installation contains a total of 817 feet of conveyor. The entire motor assembly, inspection, testing, painting and shipping areas are similarly conveyORIZED for a total distance of 730 feet.

An overhead monorail-type conveyor

system forms an integral part of the d-c. coil dipping-and-baking operation. One track section of this conveyor is raised and lowered by means of an electric hoist to dip coils suspended from racks into a tank of insulating varnish.

In the shipping area, motors packed in corrugated containers, wirebound crates and standard crates are carried by lift trucks to the warehouse area, where they are pallet-stored. This area, 56 feet by 46 feet, is equipped with special racks similar to those used in the raw materials and finished parts storerooms. These steel racks, including the necessary bracing pieces were partially pre-fabricated by an outside contractor and then assembled on the spot in the Ashtabula plant.

It is also highly interesting to note that throughout the entire plant, in all key production departments and adjacent areas, individual machine tools and work stations are served by their own jib cranes and electric motor-operated hoists. At no point throughout the manufacturing cycle is heavy lifting required of the workers.

With the exception of sheet steel and

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- ASSURES EFFICIENT BEARING OPERATION

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Outstanding advantages include —

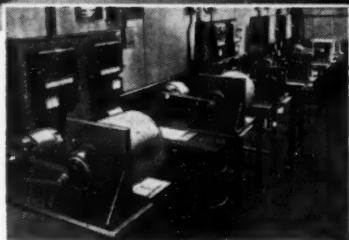
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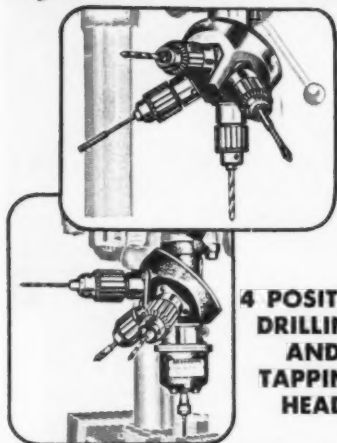
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bar stock, all incoming and outgoing materials, parts and products are transported by lift trucks where operations are not conveyorized. As the plant is now working on a regular two-shift, and on bottleneck operations, on a three-shift basis, the demand on the transportation equipment is very heavy and exceptional maintenance must be provided if materials and parts are to be kept flowing into production at a high rate.

To meet this stringent requirement, a "service station" for maintaining these trucks has been provided. In this area, 35 feet by 15, trucks are thoroughly inspected and checked and their batteries changed at the end of each eight-hour production shift. The area is equipped with battery chargers, storage racks and conveyors. All major mechanical repair and service work is done on Saturday mornings when the plant is not in operation.

Because this overall "preventative" maintenance program has proved so effective, out-of-service time of lift trucks is virtually nil. Little production time is lost or processing interruptions, incurred due to truck break-downs or failure to move materials in high tempo. **THE END.**

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The building is fully equipped with the latest, high speed, automatic and precision machinery, in order that everything produced by the company can be made under one roof.

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Analysing the
Problem

Designing the
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Planning
Production

Tooling Up

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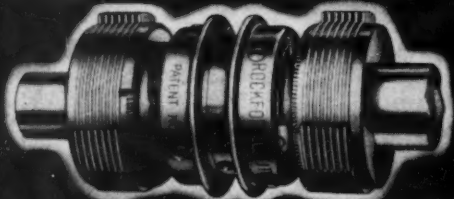
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Production Units



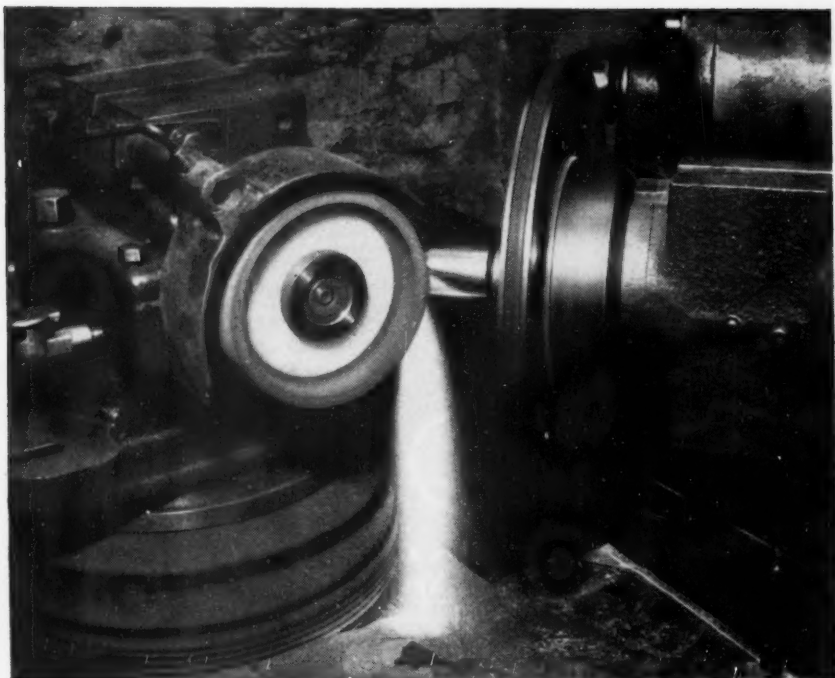
TOOL SALVAGE

PRODUCTION COSTS are in everyone's mind these days. Tool costs, of course, have a very important bearing on production costs, and reconditioning tools can be a big factor in your drive for economy.

• Reconditioning tools is not at all difficult, provided you have the right wheel. The ideal wheel is a Robertson "Cool-Cut." Because of the open structure of this wheel, the grains remove the metal rapidly . . . yet you obtain a finish equal to that produced by a close-grained, conventional wheel.

Here is one example of the sort of work a "Robertson" does on a tough reconditioning job. A 6" x $\frac{3}{4}$ " high-speed milling cutter was re-cut in 15 minutes. A regular conventional wheel required 40 minutes to do the same job.

Another interesting reconditioning operation involves surface grinding steel-and-carbide reamer blades, inserted-tooth milling cutters and other carbide-tipped tools. The carbide tip and the steel can be ground in the same operation with the same Robertson Wheel without glazing the wheel or generating excessive heat. The depth of the cut varies according to the size of the piece, but

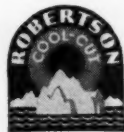


small reamer blades, for instance, can be successfully ground with .002" down feed and .015" cross feed. Robertson Wheels for this operation range from 7" x 1/2" to 12" x 1" in size.

For the best results from any grinding operation, make sure your grinding wheels are "Robertsons" . . . the wheels that are precision-built for the toughest jobs. Write for your free copy of the interesting pocket booklet "How to Buy Production Time."

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Lecture No. 18

SELECTING THE EQUIPMENT TO BE OFFERED

by

E. Payson Blanchard

Director of Sales, The Bullard Co.

The selection of the equipment for any particular installation or purpose requires consideration of the conditions existing in each case. The final decision with regard to selection of equipment depends upon the economic and financial analysis. Remember that equipment is not chosen for the acme of performance, but for the accumulation of profit. It is up to the salesman to prove how closely these coincide for the benefit of the customer.

THIS SUBJECT of "Selecting the Equipment" is probably one of the most important and most extensive subjects in this entire series. The selection of equipment is the key decision between the salesman and his customer. It calls forth all the engineering knowledge required in selling machine tools, but, more important, it turns the spotlight on the subject of capital investment, manufacturing cost and profit. Such selling requires a knowledge and under-

standing beyond the technical requirements of the job. It leads into questions of business administration and the economics of manufacture.

The engineering involved in basic design of machine tools is fundamentally important in that it must adequately meet the modern requirements in metal cutting, but refinement in design beyond the basic elements is more often aimed at economy in use. Therefore, the salesman is called upon to justify the extra in-

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modern metal cutting are adequately met since the more controversial points in a sale occur in the realm of method, that is, applying the machine to the specific job, and are generally measured in terms of investment and cost, it may be helpful to present a brief discussion of the elementary principles of economics that apply.

Certainly, machine tools are not designed and built for any truly intrinsic value. They are built to be used. They are intended for the production of other goods of value. They are a means of creating wealth. The stated value of any good exists or is appreciated and enhanced by the attributes of form, time and place. The principal factor in the value of a machine tool itself is form; therefore the emphasis on design; but machine tools themselves are of relative value, as their form or design contributes to the facility of creating form and value in the products made on them.

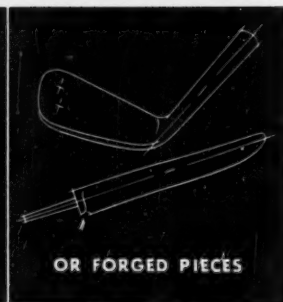
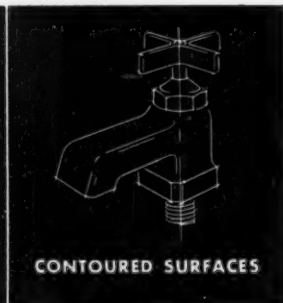
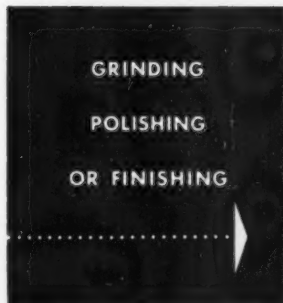
The simplest form of machine tool provides only the mechanical means of cutting metal; that is, it produces an enhanced value in the form of the materials on which it works. The basic applications of a machine to its purpose may be termed fundamental mechanical ability, and any refinement beyond this, the attributes that save cost and ease the burden of work, may be classified as production facilities.

We need not review here the historical progress of tools used by man, from the first hand tools down through the application of power, later the use of

vestment in such refinements by a saving of cost in performance. He immediately is faced with questions beyond the ordinary technology of cutting metal; questions which extend into the field of industrial economics. Qualifications for sales ability in machine tools, therefore, must include not only engineering knowledge, but an understanding of economics and business administration, with a sufficient smear of common sense and personality to avoid being offensive until the customer can get to talking about his own machining problems.

Assuming then that the requisites for

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guided tools for accuracy in form, and finally leading through to specialized tools, such as automatic tools and multiple tools. It is obvious that the concentration of ingenuity in the earlier implements was toward mechanical means or merely the ability to perform, while later improvements for use were in the category of method or facility of production. Ease in use, ease of human effort and ease in cost economy; these are the attributes of method.

Machine tool selling must therefore present ample mechanical means plus economy of method at a capital invest-

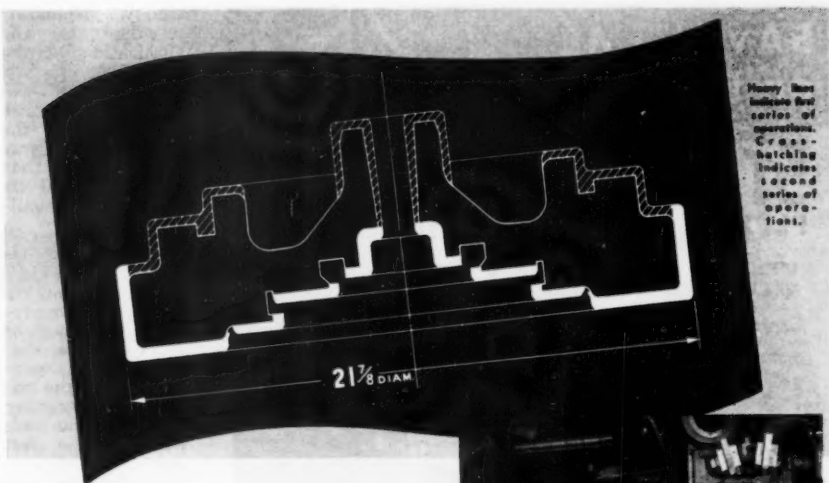
ment justified by the nature of the enterprise. The nature of the enterprise leads to further inquiry into the economics of manufacture, division of labor, transfer of skill, the analysis of factors contributing to cost and the derivation of profit. Then comes the comparison of cost by reason of different methods, on the basis of competition, and the consideration of which method shows the lowest cost for a given quantity and quality of form production for a given market price of value.

Let us turn our attention to the simple elements of mechanical ability and production facility as applied under various conditions of volume in production.

Considering again the mechanical creation of form and value, we can start with elementary geometry, in figures that have form and substance. A point in direct motion creates a line, a line in direct motion creates a plane or

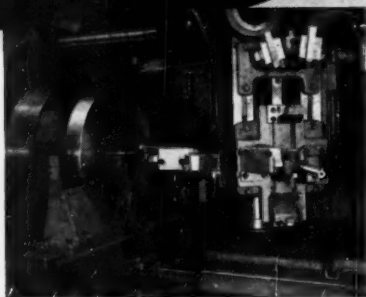
a surface; and immediately you are presented with the Planer. A point in circular motion about a center creates a circle and a circle in direct motion along its axis creates a cylinder; and you are presented with the Lathe. The origin of these surfaces is the single point tool in direct motion combined with the motion of the work.

Next, combine the circular motion of the tool with the work moving in a direct line and you are presented with the Drill and the Milling Machine. It is not necessary to subject you to a lengthy "Euclidian Analysis" of the forms that are



32 OPERATIONS ON TWO P&J AUTOMATICS IN 17.05 MINUTES WITH P&J TOOLING

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- 3rd TF — Rough rear taper hole.
- 4th TF — Semi finish rear taper hole. Finish face hub. Finish face at rim. Break corners.
- 5th TF — Finish rear taper hole. Finish face hub.
- 6th TF — Size turn hub.

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presented for modern production on machine tools, but it is these fundamentals which are the basic elements in any machine tool design. Planing, turning, drilling, milling and grinding are the prime motions in the creation of form. Derivatives of these, and just as commonly known today, are shaping, facing, boring, broaching, etc., all of which are familiar to you. It is interesting to note that Professor Roe liked to point out that a cylinder could be produced by planing or shaping, by milling or broaching, with various degrees of effi-

ciency, depending on the form and application of the cutting tool; but that turning was the simple, natural, and therefore the most efficient way of creating this form in metal by the present available means.

Machine tool design engineering deals primarily with means to provide such motions as we have discussed. It is presumed that the engineer in designing such machine tools will use the best and latest principles, devices and materials known, combining them with his knowledge of the factors of strength of materials, power application, speed of operation, bearings and lubrication drawn from various principles of science and applied as required to his purpose. Modern machine tool design encompasses much more than this in its later applications of pneumatics, hydraulics and electronics. The design must further deal with the

properties of the material in which the final objective form is to be produced. We know that the machine tool field is restricted to the ability to cut metals. But the factors involved in cutting metals comprise a cornucopia of ever increasing scope in the volume of knowledge required, to cover, not only the range of metals alone in the product, but multiplied by the range of the materials by which they can be cut.

Within this broad field any specific machine tool design is intended for efficient operation within only a limited

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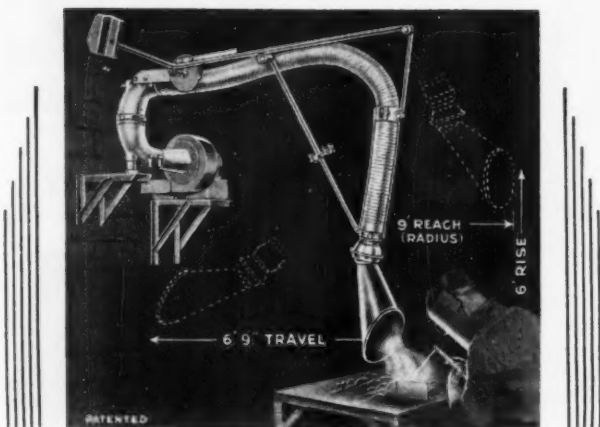
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RUEMELIN Fume Collector *Removes Welding Fumes at the Source...*

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MANUFACTURERS AND ENGINEERS — SAND BLAST AND DUST
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range. Such limitations are governed by the practical balance in use of the factors of size, speed, power and strength for the rigid support of work and tools. It would be logical, in the case of a new enterprise in the field, for the engineer to observe the market through the eyes of the sales force, to determine where the highest frequency of opportunity occurred in the use of a machine tool of a given design. But again such related subjects as market analysis are covered in other parts of this series and we must return to the consideration of selection of equipment for any given field, for any given

purpose for any one piece, or for a single operation, and then in combination of multiple purposes in mass production for any given combination of operations peculiar to a specific requirement (process engineering).

Turning now to a study of some of the factors which facilitate production, the first logical advance is multiple tooling. Assuming an optimum combination of feed and speed, the time for a given cut may be divided by the number of tools that can be applied under the same conditions; but limitations must be considered. Will the savings in time per piece for the quantity required be sufficient to justify the cost of the means, and the time for setting the extra tools? Further, if all the tools are not operating under the same optimum condition, compromise has occurred. Wider latitude is permitted in a machine designed with the use

of multiple heads, for a variation in rate of cutting can then be used. The widest latitude occurs in multiple station type of equipment for progressive operations.

The selection of the equipment for any particular installation or purpose requires consideration of the conditions existing in each case. For the purpose of the job shop or the maintenance department very general-purpose equipment is naturally recommended where the factors of range in capacity and rates of cutting with facilities for universal application within its field are prime considerations. For some of the work re-

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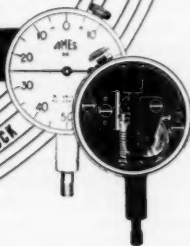
Think we're pulling your leg? We're as serious as the chip maker who uses an Ames No. 516 Thickness Measure to check potato slice thickness, thereby controlling material costs and assuring a finished product that is tops in quality and appeal.

New, unusual uses for Ames Gauges — uses that bring more profit dollars to the user — are being found constantly. Surely it's worth studying your product or process to find where an Ames Gauge could brighten your profit picture. Write for details.

Address inquiries to Home Office, 28 Ames Street

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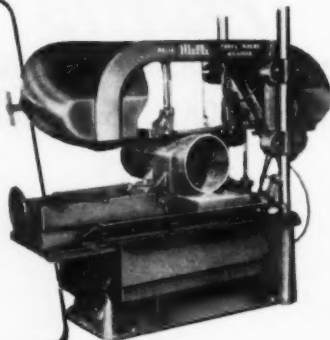
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The Wells No. 12 Saw is a sturdy production tool for fast and accurate cutting at a minimum cost. It doesn't require an expert to operate this machine. Just place the stock in the quick-acting vise and push the starting buttons—the hydraulic head descends automatically, feeding the blade into the stock at a uniform rate, governed by electrically controlled, adjustable blade pressure. At the completion of the cut the head returns to a predetermined raised position and the motors shut off.

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707 COOLIDGE AVE., THREE RIVERS, MICH.

quired of it, it may present a compromise in certain factors.

The better equipped shop in the jobbing field may be able to specialize more closely in range of sizes, capacity and rates for a given field of work and often a general-purpose machine may be purchased for a specific job but with the intention of having facilities beyond the present requirements for their versatility value in future possibilities.

And so the economic creative value in equipment can vary widely from general purpose within its field of mechani-

cal functions, through the restricted purpose in classified operations, to a piece of equipment which may still have certain desirable universal features but applicable only in a highly selective and restricted type of work; or, finally, into the range of specialized equipment for single purpose, plus automatic operation; or to the ultimate of multiple automaticity. The useable value of equipment for a specific job may be measured entirely by its immediate intended use, but the customer will generally give consideration to the value of added features which will increase the range of application.

For actual comparison of the use of various methods representing the various degrees of refinement in machine tools, available for a given purpose, we are presenting four examples in their respective fields of operation:

1. The shaft cut to length 8 $\frac{1}{4}$ " long

from 1 $\frac{3}{4}$ " stock and centered could be machined in an ordinary engine lathe—production 8 pieces per hour;

The same work performed in a turret lathe with its further refinements, would give a production of 20 pieces per hour;

When the job is considered on a single spindle automatic lathe, production jumps on two machines, to a total of 86 pieces per hour;

The same job from bar stock in a pair of 8-spindle automatic screw machines, would produce 106 finished pieces per hour;

Remove ^{up to} 6 cu. ft. of Cast Iron per Tool Grind

on Modern Planers



Kennametal Mechanically-Held Assembly Provides Outstanding Sturdiness; Permits Full Use of KENNAMETAL

Improved Shockproof KENNAMETAL K1 Withstands Heavy Cutting Pressures and Cratering Action of Modern Types of Cast Iron

Strong, Durable, Clamped-on Kennametal Planer Tools ... Make Heavy-Duty Planing Practicable

Now you can take heavy roughing cuts at high speeds (100-250 ft min) on any of the newer type planers having a tool lifter. Clamped-on Kennametal Planer Tools make it practicable ... and profitable. They remove metal at a faster rate—keep machine down time to a minimum—reduce tooling cost per piece—minimize grinding time and confusion.

Yes—you need a good, rigid, properly-powered, correctly-adjusted planer. And you must have a strong, shock-proof, thermal-strain-free carbide tool that can take a beating and like it. Here's where the uniformly sound structure of mechanically-held Kennametal K1 pays off. Read

these typical performance reports:

"Kennametal Planer Tools remove 6.5 cubic feet of semi-steel per tool grind." "5 cubic feet of 180 Brinell cast iron removed per grind." "6 cubic feet of 180 Brinell cast iron removed per grind."

Our field engineers can help you apply this cost-cutting Kennametal tooling to your planing operations. Ask them to do it. And keep in mind—the cemented carbide that has the strength and durability to do tough roughing jobs on planers successfully is the carbide that can cut tooling costs on all your milling, boring machine, and lathe work. That's Kennametal.



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AND CUTTING TOOLS THAT INCREASE PRODUCTION



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Make Quick, Accurate Adjustment
WITH SCULLY-JONES
ADJUSTABLE-ADAPTER-ASSEMBLIES
FAST AND EASY as 1-2-3



- 1 Release set screw in the side of spindle.
- 2 Release screw to cut.
- 3 Shorten or lengthen projection by turning the nut.

In multiple spindle drilling and tapping, save time and money; eliminate trouble and delays; adjust drills and taps fast and easy as One, Two, Three.

Set-up is not disturbed. Accuracy is assured as spindle screw retains the adapter in position, and key furnishes the positive drive. These adapters are carefully heat-treated and ground to assure concentricity.

For complete information refer to page 38, and 64 through 78 of Scully-Jones Tool Engineering Manual 500, or write for details.

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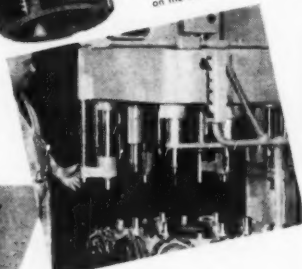


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Scully-Jones Adjustable Adapter Type Assemblies, being used in a Special Multiple Spindle Machine.

ENOT 11105 R

tory production facilities in handling the work and the chips, the cost for overhead and labor, and the maintenance of the machines and tools.

2. A gear blank, which could be machined on an engine lathe at a production rate of seven minutes a piece.

The turret lathe would consume three minutes and twenty-four seconds.

An automatic single spindle chucking machine would require three minutes.

An automatic multiple spindle station-type machine would do the job in about forty-five seconds.

3. Perhaps an even more interesting study would be represented by the automotive cylinder block, covering the operations of drilling, chamfering and tapping for the top surface and two sides. This block would have 130 drilled holes on three sides; 60 of these holes would be tapped, and of course the tapped holes would have

to be chamfered prior to the tapping operation.

A radial drilling and tapping machine with hand-operated trunion fixture would require about 60 minutes for drilling and 60 minutes for tapping; that is, 2 hours per piece.

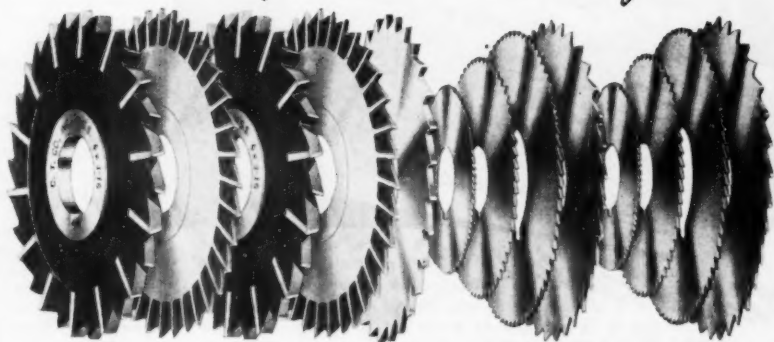
A multiple spindle, vertical, one-way drilling and tapping machine would require the use of seven machines to cover all phases of the work, and the finished production of the line would amount to 50 pieces per hour.

A way drill would give an estimated production of 50 per hour, but would re-

A highly special, single purpose, automatic, multiple spindle, multiple head and multiple tooled machine has been estimated as capable of somewhat better than 300 pieces per hour, requiring two machines.

The above figures are derived from the use of the same factors in rates of speed and feed, and the results aptly indicate the advantages in method of the various degrees of refinement of equipment. Obviously, the investment varies from 1:34 in ratio; while the ratio of production is from 1:38. But along with such figures must be considered the cost of the fac-

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TROUBLE REPORT		
Machine Time	15 min.	OK
Set-Up Time	65 min.	NG
Remarks	Spent 15 minutes hunting for arbor spacers! Same on every job!	
Recommendation	Order 2 Sets of De-Sta-Co arbor spacers for each milling machine! JB	

That's Right!



ARBOR SPACERS
Keywayed



SHIMS
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When machinists waste time hunting for arbor spacers it costs you plenty! A money-saving solution is to provide an extra set of De-Sta-Co arbor spacers and shims for every milling machine in your shop. Demanded by name for over 30 years, they're the machinists' preference for spacing of cutters, saws and slitters, for shimming gears and bearings and for all machining set-ups. Two sets per machine will save set-up time on your jobs.

De-Sta-Co arbor spacers come packed in standard sizes from $\frac{3}{8}$ " to 4" I.D., thicknesses from .001" to .125", all with keyway. Handy cellophane envelope contains set of 19 graduated decimal thicknesses. Shims supplied in same sizes without keyway. Specials, thicknesses over .125", available in popular sizes, machined from bar stock, hardened and ground, with standard keyways. Order De-Sta-Co arbor spacers and shims from your mill supply house.

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Detroit 3, Michigan

quire only four operators of the seven required in the previous method.

A nine-station type drilling, chamfering and tapping machine with one operator taking care of all operations would produce 70 pieces per hour.

4. An automotive cylinder block, considered for milling and broaching operations.

The time study charts show that by using a knee and column type tool room milling machine, equipped with fixtures designed for efficient small lot production, the total time required for the job

would be 30.81 minutes.

The same work using the method indicated by a standard production milling machine, shows a production time of 21.12 minutes.

If a special production type machine were used, taking advantage of multiple cutting, the total overall production time would be 9.51 minutes.

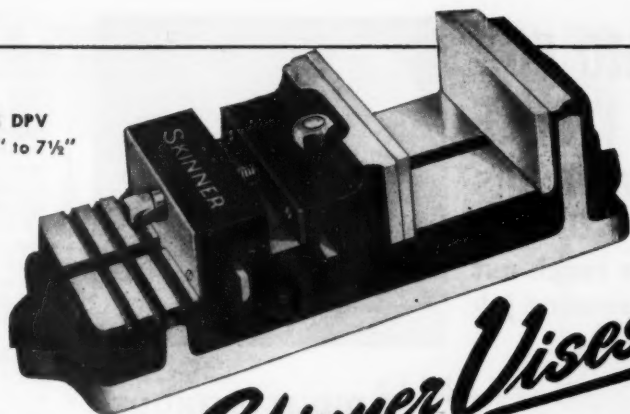
A distinctly special, high production set-up utilizing broaches wherever possible would give a production of 2.95 minutes per piece.

Further conclusions may be drawn by a comparison of the investment and cost of production for each of the set-ups in the examples shown; but since this is a prime part of the discussion of the economics of equipment in manufacture, it is left for the future. Sufficient here to point out the effects on production of refinement in equipment and method for varying quantities in production,

but the final decision with regard to selection of equipment depends upon the economic and financial analysis. Remember that equipment is chosen not for the acme of performance, but for the accumulation of profit. It is up to the salesman to prove how closely these coincide for the benefit of the customer and under the manufacturing conditions which his proposition stipulates.

The final selection therefore, is a conclusion drawn from engineering facts, from close scientific estimates based on engineering knowledge, from actual con-

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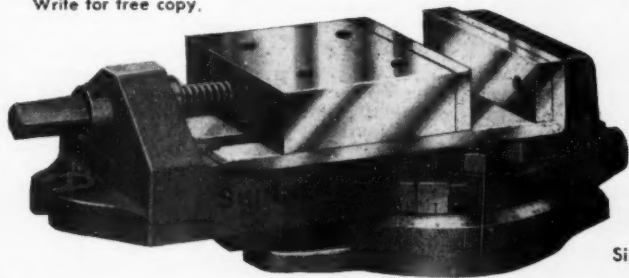
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Series DPV wrench-operated Vises have semi-steel body and hardened and ground work holding surfaces. They have all the universal features so necessary for drill press operations. Clamp the work for drilling in one plane — drill — turn the vise on edge for all right angle drilling operations.

Series FS Vises have swivel base for accurate indexing necessary in milling operations. Top of the movable jaw is ground parallel to the base for use as an indicating base for setting cutters, trueing work, etc.

Details on the complete line of Skinner Vises are contained in Catalog No. 61. Write for free copy.



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on a tough nut
running job



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**DID IT WITHOUT
KICK OR TWIST**

A tractor dealer, servicing cleat-type machines, ran up 500 nuts and cap screws per tractor... requiring 10 hours of fatiguing work with hand wrenches. The I-R Impactool was demonstrated and purchased after the job time was cut in half. The dealer figured that the Impactool paid for itself on 14 units... or 73 hours of use... an easy way to put more profits into the cash register.



KIT No. 1—IMPACTOOL, with standard equipment, plus a complete assortment of attachments in a Handy De Luxe Case. 110V or 220V, AC or DC models available. 432-10

A MULTI-PURPOSE TOOL

Actually, the Impactool saves many additional hours of time and hard work because the powerful rotary impact blows take the drudgery out of many other service and repair operations such as reaming—tapping—screw driving—wood boring—drilling—hole sawing—driving and removing studs—extracting broken studs and screws—wire brushing—drilling masonry—etc.

You can increase your profits with these easy-to-use, time-saving Impactools that everyone is talking about. Ask your Ingersoll-Rand distributor for a free demonstration.

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ORIGINATOR OF IMPACTOOLS—air and electric

ditions existing in the customer's plant, from opinions and speculative factors with regard to developments, and from a final financial analysis. The customer approaches such a problem very often with a very complete understanding of the factors and conditions and frequently with a premeditated preference which may or may not be well founded. He requires to be fully informed by the salesman on all of the factors involved, frequently including an estimate which analyzes the operations and states rates of performance which are presumed to be capable of accomplishment, under the

conditions imposed.

It is presumed that an honest check of the factors and rates of performance offered in the estimate will be in keeping with the customer's own intimate knowledge of the job and that the machine tool builder has presented his proposal on the basis of an honest estimate of the ability of his equipment to produce, and since engineering deals with material things, facts, established principles, and theorems, only a minor phase of the conclusion can be referred to matters of opinion. This is the basis for the statement, often quoted, that most machine tool equipment is bought, not sold.

A comprehensive and accurate estimate, however, is a vital part of most deals, and therefore it is extremely important that the field salesman should have a full understanding and make a complete report of the conditions surrounding the project. Many

companies fortify their salesmen with check lists, if not with complete forms for the obtaining and transmittal of data on any given project from the salesman to his engineering colleagues in the estimating department, in order that they may have a full conception of the job when preparing their analysis. Samples of such forms and check lists are exhibited here.

On the part of the customer an exhaustive analysis is generally made of each proposal and the factors involved in this analysis are shown in other exhibits, which indicate not only the comparison

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The most important
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The Leach 6 x 12 Surface Grinder actually handles 90%
— yes, 90% — of the work of larger, far more expensive
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OVER THE WHEEL GRINDING FIXTURE



For grinding ends
of pieces too long
to grind under the
wheel on surface
grinders.

For grinding ends
of long die sec-
tions, fixture parts,
precision shafts,
and gages.

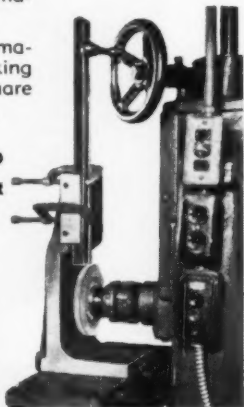
Made from close grained grey iron castings, rough machined, normalized, sand blasted, and finish machined.

Accurately machined, working surfaces square within .001.

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of investment and cost of each given method, but how such methods may influence or be influenced by previous or subsequent operations in the whole manufacturing process.

Finally, with conclusions so scientifically based, openly arrived at, the man with the best proposition to suit the case generally wins, but most often on the thoroughness of presentation, rather than personality or sales psychology. If the salesman is faced with a conclusion against him which in his own logical opinion is incontrovertible, it is the better part of valor to accept it gracefully and save his reputation. Obviously, a well informed sales engineer who understands his equipment and its place in the field, and the principles of economy and manufacture, would add considerably to his stature by declining to quote on a project where he felt sure that his line of equipment was not suitable to the purpose and where his line of conversation was the only hope of winning an order; for if he wins it, the customer will eventually learn the truth, to the complete detriment of the man and of his company.

One of the capable old-timers that many of us knew once stated that a machine tool salesman was distantly related to the Centaur of Greek mythology, which was half man and half horse. There is no hope of success today for the salesman who is half man and half bull. End of Lecture No. 18.

HOUGHTON ESTABLISHES NEW PRODUCT DEVELOPMENT DEPARTMENT

A new product development department has been established by E. F. Houghton & Co., Philadelphia, manufacturer of industrial oils, chemicals and leathers, it was announced by G. W. Pressell, executive vice-president of the company. The department is set up to "facilitate the handling and evaluation of newly developed products, and to bring about closer liaison between the research, production and sales staffs," Pressell explained.

Dr. H. B. Walker has been named manager of the new department. He has been with Houghton for two years during which time he was assistant to Dr. R. H. Patch, vice-president of operations. As manager of product development, Dr. Walker will work towards the discovery of new product needs through market research, review ideas and initiate necessary research for new applications of existing products, give technical service to customers on new products, and supervise application research.

Improved **SELLING TECHNIQUE** **FOR MORE SALES**



Lecture No. 19

THE WRITTEN WORD

by

C. Denson Day

Sales Manager, Norton Co., Grinding
Machine Div.

HOW TO WRITE A PROPOSAL THAT SELLS

While the customer writes the order, we must write the proposal. How it's written frequently determines whether or not we make a sale. A proposal is the written presentation of an offer to sell. It should attract, interest, convince, and sell. What are the various parts of the proposal? How are they most effectively presented?

The MACHINE and TOOL BLUE BOOK is happy to present to its readers the complete lectures delivered at the Sales Refresher Course at Cornell University, July, 1948. The course was sponsored jointly by the National Machine Tool Builders' Association and the American Machine Tool Distributors' Association. While lectures deal primarily with the selling of machine tools the fundamental sales principles can be adopted profitably by the manufacturers of general industrial products. The editors thank the NMTBA, the AMTDA and Cornell University for their cooperation in making this material available to their readers.

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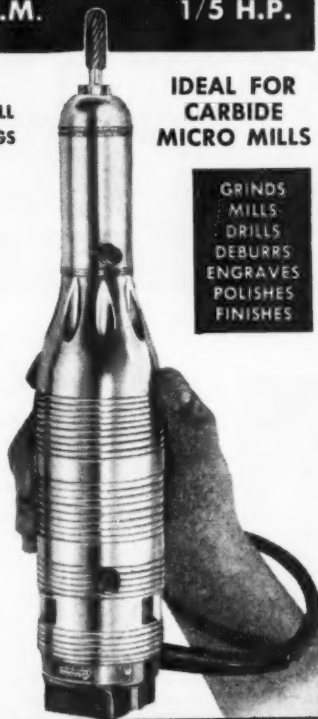
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- ★ NEW, STRONGER PRECISE QUILL
- ★ NEW SEALED MICRO BEARINGS

More than a portable grinder-miller . . . this is a high-speed precision machine tool for use with or without SUPER-COOLFLEX Shaft Attachment or as Motorized Quill mounted in lathe, milling machine, drill press, etc. Thousands of cost-cutting uses on all materials from wood to the hardest steel. PRECISE tools and attachments are available for almost any production set-up. New sealed, micro-precision bearings never need lubrication. 115 volt AC-DC motor is protected by replaceable fusetron.

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must be made by the seller and a purchase made by the buyer. This part of the process has been termed for this course as the "Written Word."

Prior to this point, the negotiations may have taken weeks, months and not infrequently, years of fact finding, discussion, consideration and reconsideration. All or certainly most of this has been man-to-man contact where personalities and the spoken word play the important part between the buyer and the seller.

The two final phases of all of these preliminaries are in writing — the proposal and the order. The customer takes care of writing the order but it is your job to write the proposal—and how that proposal is written can many times influence the writing of the order. The easier we can make it for the customer to buy a machine, the better chance there is to get the business.

The written proposal is the silent salesman. Here, in the absence of his personality, power of persuasion, ability to answer questions, etc., the written word must continue to work for the salesman and in the last analysis complete the job of getting the order. Here are presented the data that determine the decision—the features, the facts, and the figures, but the fourth and Capitol F is the Form or manner of presenting this material.

What is a proposal—quotation—bid—proposition?

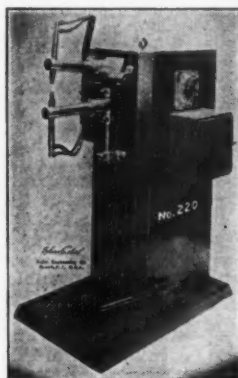
It is the written presentation of an

IN OUR field of selling machine tools we have a very complicated product in a highly technical field and the personal contact of the salesman with his customer is undoubtedly of greater importance than in most selling fields.

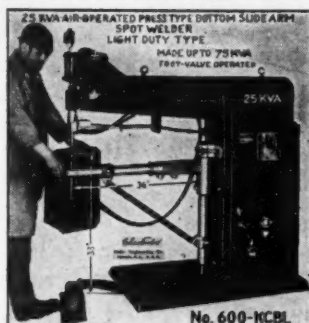
Our customers range from the one man shop where the owner is operator, buyer and maintenance man to the mightiest industrial combines in the world where many men may be involved in our work. Whereas the conditions vary in the extreme, before the ultimate objective of these two parties can be realized, an offer

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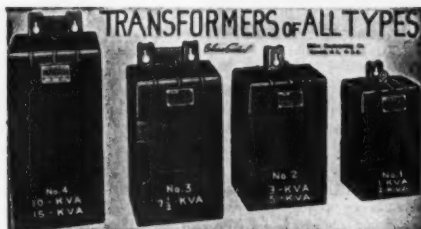


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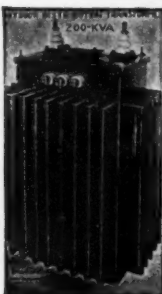


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100 TO 400 AMPS.



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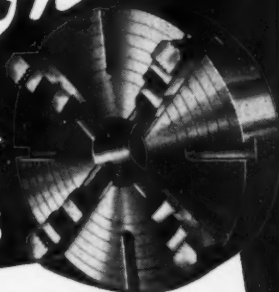


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INDEPENDENT LATHE CHUCKS

All types of mountings



Feature Gives Jaws "Steel Finger" Action

- Tighter Gripping
- More Rigidity
- Greater Accuracy
- Even Distribution of Pressure



Try it yourself. Pick up a piece of work in your fingers. That's ordinary holding. Now squeeze . . . that's Whiton Multi-Thrust "Steel Finger" action.

Work Holding Problems?
Write Whiton
Ask for catalog, too.



Makers of Fine Chucks • Steam Turbines
Centering Machines • Gear Cutting Machines

THE WHITON MACHINE COMPANY
NEW LONDON, CONN.

offer to sell. To do its job properly it should be constructed on the four points that lead to a sale. It should attract, interest, convince and sell—and that last is the life blood of our work—getting the order.

Proposals may vary from a very simple form such as a machine duplicating one already installed to a complex program covering a battery of special machines involving new machining techniques, a variety of operations, and a schedule of processing quite different from conventional or past practices.

Proposals may be written at the home office, at the branch office or at the dealer's office but regardless of source, they should be constructed according to plan.

There are three to four basic elements to each proposal.

1. The quotation itself specifying the machine, equipment, prices and terms.

2. The catalog or specification sheet describing and illustrating the equipment.

3. The covering letter.

4. The jacket or proposal cover.

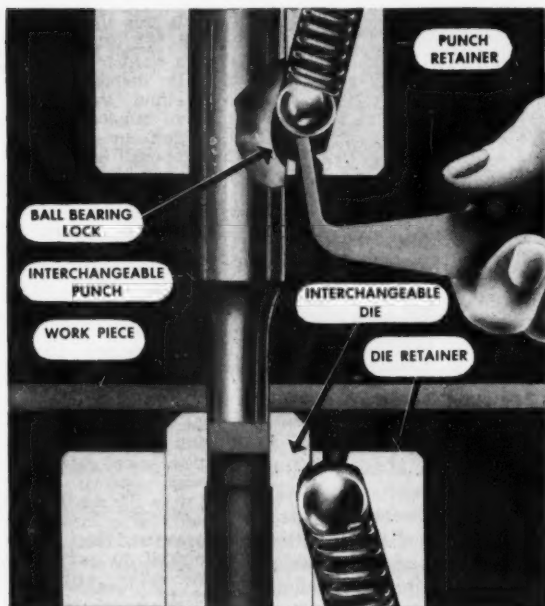
In some cases it may be possible to combine No. 1 and No. 3 and submit the quotation in letter form. This practice varies with different sales organizations whether builder or dealer. Likewise, customers' preferences vary. Except in very rare circumstances, however, the proposal should be limited to a simple size and type of machine. Each individual machine or

multiples thereof is of sufficient importance to justify individual and separate consideration and besides—that's the way most orders are written.

Machines are usually bought for one of these reasons: expansion—replacement—or new operation. Higher production lower cost, improved quality, etc., are all subdivisions of these three major reasons.

The buyer knows which one applies to the particular job being quoted and the alert salesman already knows or finds out before he quotes.

Ask yourself—Why is my particular



R-B INTERCHANGEABLE PUNCHES AND DIES

are
Simple
**TROUBLE-FREE
IN DESIGN
and
CONSTRUCTION**

Any press operator can quickly and easily install and remove R-B punches and dies. Once inserted, however, they are securely locked vertically and radially by ball bearing locks for trouble-free performance on the press. Precision-made for perfect alignment and complete interchangeability, R-B punches and dies save time and money in die-building, reduce press "down-time" materially, and unlike most die-making parts, have a salvage value.



R-B interchangeable punches and dies of standard sizes, shapes and materials can be delivered immediately. Special punches and dies, with or without the interchangeable feature, are made promptly to your specifications.

GET THE WHOLE STORY IN THIS FREE CATALOG

A 48-page book containing full information on Allied's "one stop" service. Write for your copy.



ALLIED PRODUCTS CORPORATION

Department 32 • 4644 Lawton Ave. • Detroit 8, Michigan

When Writing Advertisers Please Mention MACHINE and TOOL BLUE BOOK

169

Threadwell Tools do many jobs



try them
on your
tough ones

*Drilling problems are
no laughing matter*



Improper lip clearance is at the bottom of many drilling problems. Too much clearance often leads to the breakdown of cutting edges, while too little clearance impairs the cutting effectiveness of the drill and throws serious strain on the machine. Lip clearance is seldom a problem with Threadwell Twist Drills, because from start to finish rigid control is maintained to guarantee uniformity of every Threadwell Drill. Even the finest steel which goes into Threadwell Twist Drills is kept under constant testing and analysis to ensure that every Threadwell Twist Drill is as accurate and long lived as modern manufacture can make it, and that it produces the quality that is a Threadwell hallmark.



See your local supplier, or write for Bulletin 435R

THREADWELL TAP & DIE COMPANY, Greenfield, Massachusetts
Taps • Dies • Drills • Countersinks • Keyway Broaches • Screwplates • Gages • Pipe Threaders



machine and model the best one for the customer to buy on this particular job? After you have answered this question, then point your proposal and letter toward that mark.

In preparing the proposal, consider the psychology involved in dealing with the customer—put yourself in his position.

If I were to receive the proposal—what would I want?

I am important in this transaction—has my viewpoint been considered?

Does this cover the exact equipment we discussed?

Is this the method of processing we want to follow?

Is the alternate method the foreman suggested covered by another proposal?

How am I going to give my boss the right arguments to get this machine ordered? (I know we should replace that old clunker in Department 12.)

Remember that the man who receives the proposal usually has to sell his boss on making the purchase and this goes all the way up to Mr. Purse Strings himself. Give him the ammunition required to get the necessary approvals.

Let's take a typical example of a proposal and discuss its various elements. I have used the Norton form only because I am more familiar with it. There may be better ways of doing the job. This just happens to be one way we do it.

We are currently using a two-fold double-pocket type cover. In one side

we include the proposal and covering letter. In the other side is a blueprint of the part, the machine catalog and a photograph or two to give a better view of the tooling.

As I said before, this is purposely a simple one. There are many more factors which may be required and we will talk about these in just a moment.

We must include a blueprint of the part involved.

There must also be the covering letter that accompanies the proposal.

And last of all, the specification sheet,

CARBIDE USERS:

ADAMAS "works" on these jobs!

JOB

Turning electric motor shafts, SAE 3140 steel, from 2" down to 1½" in one cut.

ADAMAS CARBIDE USED

Specification: Style #2310
Standard blank, ADAMAS
Grade D. Delivery: Immediately
from stock.



ADAMAS RESULTS

Increased production up to 150 pieces between grinds.

Manufacture of rush order for two lip counterbores by carbide toolmaker at lowest possible cost.

Specification: Preformed blank to .015 of finished size, ADAMAS Grade B. Delivery: Seven days after order received.



Reduced grinding time per tool one hour 25 minutes. Saved \$3.75 in diamond wheel costs. Eliminated 10% loss due to cracking during rough grinding.

Forming electronic tube grids to extremely close tolerances on a heavy production schedule.

Specification: Preformed mandrel, ADAMAS Grade AA. Delivery: 10 days after order received.



Original ADAMAS Carbide mandrels used continuously without measurable wear. Preformed mandrels required only .005 to .009 to finish on all critical dimensions.

Facing cast iron gate valve. Intermittent cut over flange holes on 20" O.D.

Specification: Style V-439 standard blank, ADAMAS Grade A. Delivery: Immediately from stock.



Increased cutting speed from 90 to 240 feet per minute. Tripled number of pieces between grinds.

Replacing rapidly wearing bushings on precision jeweler's lathes used in fine watchmaking.

Specification: Preformed bushing, ADAMAS Grade A. Delivery: 8 days after order received.



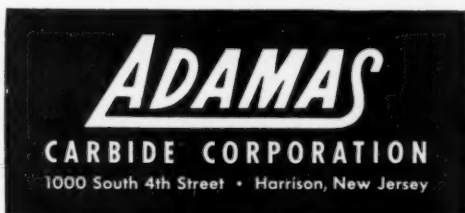
ADAMAS Carbide bushings eliminated play and maintained required tolerance for 16 months without replacement under constant use.

Let ADAMAS CARBIDE

cut your costs and

speed your production

Write Dept. "D" for recommendations
on your job, or, ask for an
Adamas field man to call.



Producers of top quality carbide for cutting tools, dies and wear resistance

SIGOURNEY M-100

MAINTAINED ACCURACY IN PRECISION WORK

The Sigourney M-100 Bench Drilling Machine is extremely accurate on precision jobs. It is unusually sturdy and rigid in construction . . . has hardened and ground spindles . . . and sealed ball bearings throughout. All moving parts are entirely closed for maximum operator safety.

M-100 is built for long and steady service.

This sturdily constructed bench drilling machine is available in 1, 2, 3 and 4 spindle models . . . speeds from 4,000 to 10,000 r.p.m.

Send for illustrated bulletin

THE SIGOURNEY TOOL CO.
Hartford 6, Conn.

Sole Sales Agents

PRATT & WHITNEY

Division Niles - Bement - Pond Co.

West Hartford, Connecticut

catalog or bulletin which contributes tremendously, should be generously illustrated, features outlined in clear concise english, highlighted according to importance, with physical capacities, feeds, speeds, specifications, weights and measurements classified and tabulated.

Promptness of preparation and delivery is vital to gain and hold the customer's interest. In "program buying" each machine quotation is one of a chain and a missing link can have a serious and disturbing influence on the process engineer or buyer. An unfavorable reaction from

the result of many hours' work by many people. Therefore, when ready for presentation they should be correct and right the first time. Requoting is not only expensive in labor and material but can be even more costly from an irritation standpoint. Customers have system too and if they have to unwind and rewind a job already in the system they don't like it. It is just another phase worth watching to make it easier for the customer to buy.

Some of these points in writing the proposal are so elementary as to appear

the customer at this particular point can set up a prejudice that may be hard to overcome and may have an adverse influence toward the ordering of your machine.

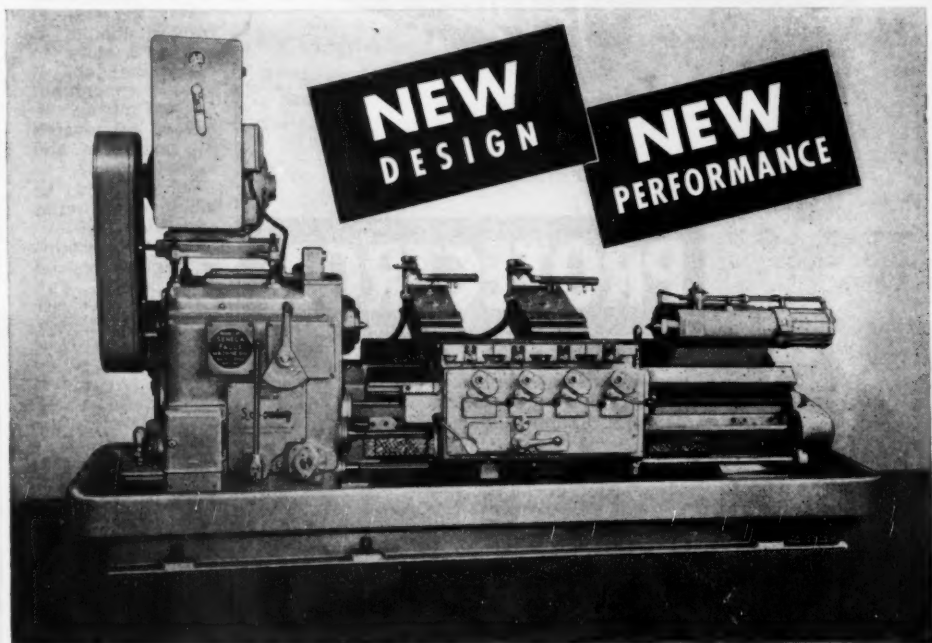
Mr. Harold Warner of Cadillac says that 75% of the proposals are incomplete and require revision or additional information. He also said this was a true measure of the sales engineer. That should be a real challenge to all of us—only 25% complete. 25% is a long way below a passing grade.

Some companies have detailed printed forms developed expressly for the purpose of securing all the information necessary to quote. These are in the form of check sheets and if properly used can eliminate a tremendous amount of later embarrassment.

Proposals are expensive to make. I have heard various estimates made of their cost being anywhere from \$5.00 to \$100. They usually represent

MACHINE OF THE MONTH

PREPARED BY THE SENECA FALLS MACHINE CO. "THE Lo-swing PEOPLE" SENECA FALLS, NEW YORK



NEW Lo-swing LATHE OFFERS UNLIMITED CARRIAGE TRAVEL FOR LONG OR SHORT CUTS

Model AP, Lo-swing's new Semi-Automatic Lathe is designed to fill the demand for a modern, high-speed, multiple-tool turning lathe, which can be set up readily and operated by unskilled labor, and in which maximum carriage travel is provided. It is ideal for shaft work involving long shoulder lengths where overlapping of cuts is not desirable, and equally suited to short run jobs requiring heavy stock removal where limited quantities do not justify set-up time on fully-automatic, closed-cycle machines.

Model AP is rugged in design and heavily constructed throughout to take full advantage of the tremendous cutting capacity of modern sintered carbide tools at

high cutting speeds and coarse feeds. Its carriage travel is limited only by bed length and is accomplished through a unique balanced, twin-pinion carriage feed mechanism which cuts the unit pressure on rack and pinion teeth in half. Carriage cross slides are power operated and individually controlled. Hinged-type roller steady rests prevent the work from springing away from the tools. Other features include: Automatic feed throwout coupled with Automatic tool relief; Rapid traverse movements for longitudinal carriage feed and cross slides and for the Automatic Back Attachment.

Investigate the cost-cutting possibilities of the newest Lo-swing Lathe. Write for Bulletin AP-49 today.

SENECA FALLS MACHINE CO., SENECA FALLS, N. Y.

PRODUCTION COSTS ARE LOWER WITH Lo-swing



WITH

PROTECTRON

Protectron prevents costly tool and die breakage. Senses oversized or overhard stock. "pile-ups", and tool dullness. Automatically trips the machine at the slightest mechanical overload from whatever cause before damage occurs. Further: Protectron cuts costly down time and lengthens tool life up to 300%. New Protectron model covering all loads is now ready for delivery.



WRITE FOR
DETAILS OF
FREE TRIAL



The Brinnell Company

GRANBY, CONN.

insignificant but their neglect can be a source of irritation or inconvenience to the buyer. Such things as correct address, attention of the correct department and individual. Does this plant require proposals to be addressed to the Purchasing Department or the Master Mechanic's Office; who requested it; have you used the correct initials and spelling of his name? You don't like it when your name is misspelled — neither does Mr. Customer.

Poor typing leaves an impression of a sloppy, inaccurate job.

What are the exact number of copies for this particular customer, adequate

references and identification of the inquiry, part name, department, operation? These are all-important to someone in your customer's organization.

Does the proposal contain enough of a word story to cover the job? It must be enough but not too much.

Have we covered the exclusive and sales features?

Should data be included on similar case histories?

Does this customer require special color paint?

Do we have the right voltage, cycles and phases?

Should the electrical equipment meet the Automotive Standards?

Do we have to take any exceptions to those standards?

Are the electrical equipment specifications properly detailed?

Are the electrical prices broken down in accordance with the Accounting Department's requirements?

Just as we expect our salesmen to have a well-groomed appearance, our "silent

salesman" should have the same characteristics. The proposal cover or binder should provide for neat and orderly appearance of its three elements.

A word about the **Investment** phase.

Much has been said about selling machine tools from a "Return on the Investment" angle but I question how much has been done along these lines in actual sales contacts with customers. Our salesmen are primarily mechanics and engineers as are most of the process men, master mechanics and superintendents with whom we work. We aren't accountants and generally speaking, don't know too much

How close can you machine a dollar



With labor and material costs at their present levels, it takes some mighty careful management to hold your *unit costs* to the tolerances required for competitive selling.

One good way to do this is to install new and more efficient machine tools . . . such as the completely redesigned **ROCKFORD 14" Geared-Head Economy Lathe**. It is fast and easy to operate and is ruggedly built for long service. Though medium in price, it provides accurate work . . . for the tool room, maintenance shop, or production line.

We'll be glad to send you full particulars. Write for Bulletin 462.

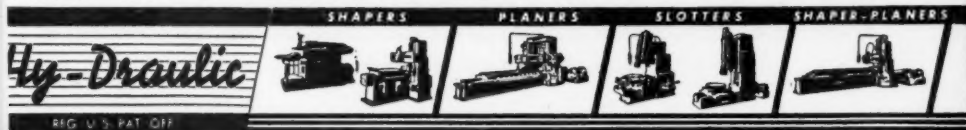
ROCKFORD MACHINE TOOL CO.
ROCKFORD • ILLINOIS

4816



**ROCKFORD
14"
Economy
LATHE**

ALSO DESIGNERS AND BUILDERS OF ROCKFORD

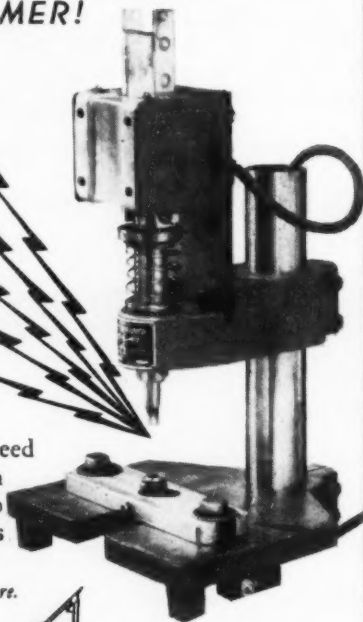


ELECTROPUNCH



**A NEW LIGHTNING FAST ELECTRIC
IMPACT HAMMER!**

**staking
riveting
cutting
marking
swaging**



A low-priced, high-speed
production unit with
controllable impact up
to a ton. Four models
available.

Write for descriptive literature.

BLACK & WEBSTER, INC.

30 PLEASANT STREET, NEEDHAM 92, MASS.

about interest on investment, capital structures and accounting procedures. Most of the buyers who actually select and recommend the machine to be bought either are not familiar with these phases or are handed a formula by top management and they simply fill in the figures. Beyond all this, I know from my own experience that there has been a definite reluctance on the part of customers to disclose their formulae, facts and methods of calculating.

I do feel this is an important phase of selling and a field in which there is

the greatest opportunity to get orders — lots of them. I know there are tremendous numbers of grinders in operation that should have been discarded long ago, but remain in plants simply because "they are doing good work." There's a lot more to profit and loss statements than just an offhand opinion.

It is my feeling, however, that this job must be negotiated more from the top down than from the bottom up and our efforts should be directed toward determining the "why" of customers' depreciation and replacement policies and practices. When we know the "why" then we can set our course to sell "The World's Best Investment" on an investment basis. We don't know how to do it today.

When something can be developed—call it a formula or earning statement, that will show "return on investment" in clear, concise form — the place for it will be in the proposal; and gentlemen, that will be the most effective written message we can include.

Production Estimates: A major portion of all proposals made include some information on the production which may be expected from the equipment offered. This is a very broad subject in itself and one which could be discussed, even argued, when all of the ramifications involved are considered. To the extent that such figures appear with the proposal, I believe a few thoughts on the subject are in order at this point. Here



*Kind to Operators'
Hands...*

THE NEW P&W

KELLER CARBIDE

★ It's the Di-Bur fluting that does away with the nuisance of sharp, annoying slivers from die steels

★ Produces powdery, granular chips you won't even feel

★ Leaves a fine finish, even at slower speeds

★ Easiest of all to control

Pratt & Whitney

Division Niles-Bement-Pond Company
WEST HARTFORD 1, CONNECTICUT



★ Bring your bur-facts up-to-date... write for the details on the new P&W Keller Carbide Di-Bur

Di-Burs can be resharpened as well as other carbide burs. Use the P&W Bur Resharpener Service for all your burs, regardless of make — it's fast, inexpensive.

**KELLER
CARBIDE DI-BURS**



**A 564-Page
Authoritative Handbook
TOOL STEEL SIMPLIFIED
Yours for only \$2.00 postpaid
Over 87,000 copies in use**

Completely Revised!

**Which of its 21 data-packed chapters
can you use most profitably?...**

Part I—Getting Acquainted with Tool Steel

Tool Steel Terms... Analysis of Tool Steel... Soundness and "Personality" of Tool Steel

Part II—Selecting the Right Steel

Alphabetical Tool Steel Selector... along with practical suggestions for selecting the one steel that will perform best, reduce costs

Part III—Properties, Heat Treatment and Testing of Tool Steel

Heat Treating Methods and Equipment (furnaces, fuels, and atmospheres)... Hardness and Toughness Testing (equipment, methods and results)

Part IV—Things Worth Knowing

Relation of Design to Heat Treatment... Hot Acid Etch Test... Timbre Test... Spark Testing... Quenching and Trouble Shooting

CLIP AND MAIL NOW

The Carpenter Steel Company, Reading, Pa. • Dept. 12C-2
Please send me, postpaid, your revised "Tool Steel Simplified".
I enclose \$2.00 (\$2.50 outside U.S.A.) in full payment of the book.

Name.....Title.....

Firm Name.....

Mailing Address.....

City.....State.....

(Please Print)

again practice varies broadly and of necessity due to differences in types of machining operations, tooling, loading equipment, etc.

First, I believe it is general practice to quote figures as an estimate — not as a guarantee. A written guarantee smacks of a legal instrument which most of us shudder at and shy away from. So much of our history and development as an industry has been on the basis of mutual confidence, cooperation and good faith with our customers that the word "guarantee" usually sets up an area of question and doubt that is not constructive.

they actually will get may be difficult to reconcile. In any event — "To your own self be true." Where ever the human element is present in appreciable degree in the operation of machine tools, wide variation in actual output can and does exist. We could all tell fantastic stories of actual occurrences. It is sufficient to say for this paper that here is where the salesman's intimate knowledge of his customer's policies, operations, practice and expectations are vital. Their expression in terms of pieces per hour in the proposal can make the difference between gaining

The production figures are usually given in numbers of pieces per hour, floor to floor time. This may be at 100% efficiency, 85%, 80% or even 75%. I don't know why there should be so much variation but there seems to be. Qualifications are included, governing the condition of the pieces as they are to be received at the machine for locating points, stock removal, concentricity, etc. Similarly with production figures quoted, there are specifications of the finished part as to size, dimensional accuracy, limits, surface finish, etc. Some people use regular printed forms to very good advantage.

Today's labor situation has an appalling effect on the quoting and fulfilling of production estimates. Whether to quote on the capacity of the machine and what you feel they should get or whether to quote the figures you know from previous experience



**FASTCUT TOOL DIV.
HILTON MFG. CO.**

**Ferndale 20,
Michigan**

Better Performance!

Tests show as much as 30% longer life on the most exacting jobs.

Lower Cost!

Gained from years of specialized experience in the manufacture of these products.

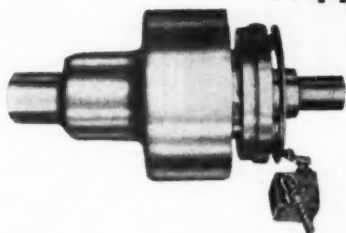
Higher Quality!

High Speed Steel—especially selected—controlled heat treatment—of special formulae—accurate machining—to exact standards—all insure higher quality and product performance.

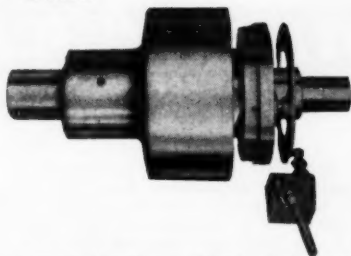
Write for Catalog
Sheet and
Price List.



BUFFALO *Torque Control* **COUPLINGS** **Transmission Type With Automatic Tripper Unit**



Showing Coupling, Tripper Unit and Limit Switch in Full-Load Running Position.



Showing Coupling, Tripper Unit and Limit Switch in Shut-Down Position.

A Positive Safeguard for Both Motor and Driven Unit

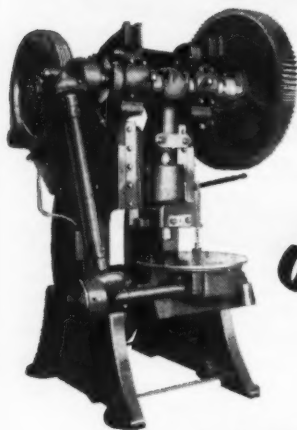
The instant an overload develops the clutch in the Coupling releases; then the dual cam operating ring actuates the limit switch arm and shuts off the power to the motor. After the overload is released and the power turned on again, the Coupling is ready to continue full-load operation without any torque re-adjustment.

Send Today for Complete Bulletin No. 1012

Buffalo Machinery Co., Inc.

838 GRANT ST.
BUFFALO 13, N. Y.

This Dial Feed Press makes



**TOUGH
JOBS SEEM
EASY**

Production engineers have learned that Federal Dial Feeds can handle a wide variety of difficult press operations...do a better job faster, easier and with much greater safety. Federals are extremely versatile, performing with equal efficiency whether the task be to punch, crimp, burr, broach, draw, stamp, pierce, or assemble. With a Federal Dial Feed you can increase hourly output, operate with minimum down time and make tough operations seem simple. Federal Dial Feeds may solve a specific problem for you. Available in eight sizes from 6.6 to 79-ton capacity. Write today for the new Dial Feed Catalog.

The Federal Press Co., 494 Division St., Elkhart, Ind., Phone 2831

FEDERAL

BUILT FOR



PRESSES

SERVICE

or losing not only this particular order but more important they can be a credit or reflection on the integrity of the quoter. It is evident too great stress cannot be laid on the importance of the accuracy of the production figures quoted.

One very important phase of our subject that should be developed in this course is the imperative necessity for using good clear simple language. This applies to the written word as well as the spoken word. Sales correspondents, dictators and letter writers should be taught the fundamentals that make for

good form and content of letters. Not many good letter writers are born; most of them are developed through training and practice. Some we find through trial and error.

It has been said many times that engineers as a group are the most inarticulate of all of the professions. It is felt that our schools and particularly the technical schools do not place sufficient stress on the use of good english. This condition can be a very serious handicap to a salesman if he does not set about to provide self improvement.

The American Management Association, in the course of their work, has developed a form for appraising a letter which I think will be of interest at this point.

To be sure, every letter written by your organization can't be analyzed against such a check sheet, but the sales correspondents and salesmen whose job it is to handle the written word

should be taught and guided in the most effective way to get their point across just as they are taught and guided in learning what are the most important points of the machine being sold.

The personal element and tone in the letter is another important phase. Sales letters should be in a friendly, conversational style, just as the salesman would talk were he there. One company that I know has used a certain book to good advantage in their training of sales correspondents. The title is, "Effective Personal Letters—A Manual of Social Correspondence in Business," by W. H.

YOUR "SPECIAL BUSHINGS"

May Be Our Regular
STOCK ITEMS!



Accurate
Interchangeable
Concentric

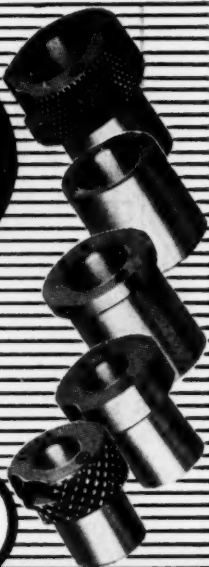
Ready for Immediate Delivery

TWO complete bushing standards, the A.S.A. Standard plus our own Acme Standard, enables you to obtain bushings from stock that might otherwise require special manufacture. Results in faster delivery, lower cost. Write for catalog.

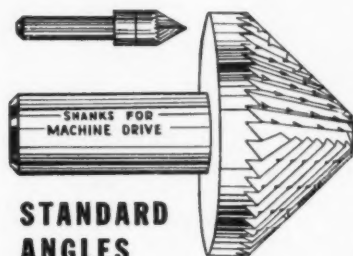
Acme Industrial Company

Makers of Hardened and Ground Precision Parts
210 N. Laflin Street • Chicago 7, Illinois

THE SERVICE SHOP TO INDUSTRY FOR MORE THAN 25 YEARS.



INSIDE DEBURRING CUTTERS



**STANDARD
ANGLES**

30° - 45°
STOCKED IN 8 SIZES
EACH ANGLE



**SPECIAL ANGLES
FROM STOCK BLANKS**



**HIGH SPEED
STEEL**



**HANDLES
FOR
HAND USE
(4 THREAD SIZES)**

**RADIUS TYPE
10 SIZES**

WRITE FOR BULLETIN NUMBER 15-1

SEVERANCE TOOL INDUSTRIES INC.

722 IOWA STREET
SAGINAW, • MICHIGAN

IN WORKING

Aluminum

the lubricants used largely
determine the results

FISKE Lubricants are used in progressive metal-working plants that efficiently produce the highest types of products, with minimum shortage and tool wear.

FISKE RECOMMENDATIONS

FOR MACHINING	C. S. A. #2 Cutting Oil
ROLLING	Majestic Soluble Oil
DIE CASTING	231 Die Casting Compound
STAMPING	} . . . Magic Compound
FORMING	
WIRE DRAWING	

There is a Fiske Lubricant for every metal working operation. Each is an outstanding product and results in more production, better finish and increased tool life. Let us solve your special problems. Write today to Fiske Brothers Refining Co., 135 Lockwood St., Newark 5, N. J., or 1506 Oakdale Avenue, Toledo 5, Ohio.



Established 1870

METAL WORKING LUBRICANTS

Butterfield.

Now to comment on some of the variations in sales proposal practice. Let's start with the cover or folder. Some people don't use any—preferring the simple letter form.

There is the simple single fold type and this has several variations.

Then there is the three fold type. There are various methods of attaching the material, some are loose and unattached, some stapled on the top, some stapled on the sides, some are punched for brass pins that go through and bend over, some use one pocket, some have two

order may be cancelled, if at all.
Prices—Subject to change—Escalator clause.

Production Estimates.

Acceptance—by home office.

The following clauses are sometimes used, but are unusual:

Payment—In New York funds at par.

Title—Transfer of title at time of shipment.

Corrections—Subject to corrections in case of clerical or typographical error.

I assume most of these clauses were added as a result of some past experience, possibly a misunderstanding at one

and so on.

Quite a variety, I think you will agree, almost as much as there is between individual salesmen.

Whether or not there would be advantage to us and to our customers if a more nearly standard form were adopted is, I believe, beyond the scope of this particular paper. It may be that the Sales and Service Committee of the National Machine Tool Builders' Association may want to give the subject further study.

Proposals—There seem to be no standard rules as to composition.

Terms and Conditions—All use some. They vary from very simple to complex legal terminology.

The usual form includes:

Terms — Subject to credit approval—payment in 30 days, etc.

Shipping Point—F.O.B. works.

Delivery—Stated subject to circumstances that are described, Contingencies — Strikes — Acts of God, etc.

Cancellation—Under what conditions

MICO

2 and 3-Dimensional ENGRAVER

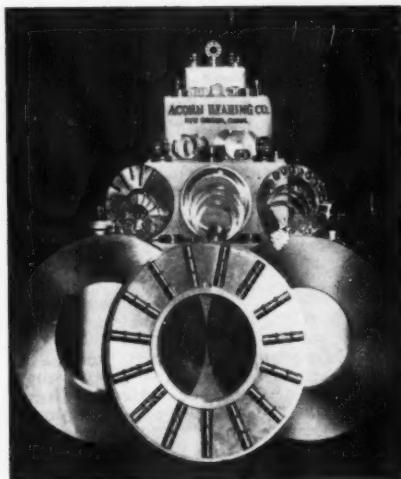
• NOW you can do three-dimensional milling by tracing shape of enlarged master with stylus. The 252 Engraver fills the need for a portable, inexpensive, dependable and accurate machine to make small dies and molds for plastics, rubber, glass, or die castings, and other forming operations. Master can be reproduced in any of four reduction ratios.



Improved pantograph design simplifies conventional engraving of templates, nameplates, panels, trademarks and machined parts.

Write for 8-page illustrated folder which gives complete details.

MICO INSTRUMENT CO. 78 TROWBRIDGE ST.
CAMBRIDGE, MASS.



Acorn

THRUST BEARINGS

Your needs for precision-built thrust bearings can be quickly met by Acorn . . . an organization which has served industry more than 30 years! Specializing in bearings. Special thrust bearings of various types and sizes . . . from 5/16" OD to 25" OD . . . can be produced. Prices will be quoted on receipt of drawing or specifications. Acorn bearings are made to be interchangeable with those of other manufacturers. So call, write or wire to Acorn . . . headquarters for thrust bearings. Contact us today. When buying bearings . . . it's as easy as ABC . . . Acorn Bearing Company.

ACORN BEARING COMPANY
66 Stanley St., New Britain, Conn.



AIR

GUNS

that last and last and last!

Air-O-chek The Valve with the internal fulcrum lever

An invention in valve means

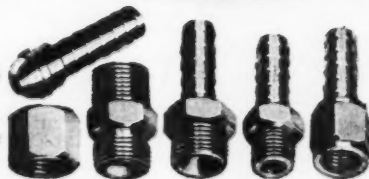


Streamlined Assembly, Air-O-chek Air Gun and standard pipe fitting ferruled to hose.

Ingenious lever arrangement makes conventional packing stem and gland unnecessary.

Used in leading foundries and machine shops.

See your jobber or write direct for full details



AIR-WAY PUMP & EQUIP. CO., 1054 N. Kilbourn Ave., Chicago 51 Ill.

time or another. This might be a good time to review your proposal forms also your terms and conditions.

The nature of the job to a very large degree determines the amount of material and the extent of the presentation which should be included.

There are cases where inquiries are received by mail from distant points where salesman's personal contacts are necessarily infrequent. Usually they are of a general character such as "Please send us prices and delivery on a Cylindrical Lapping Machine." Once in a very great while one will be received that

says, "Please quote us on a machine to lap enclosed samples to dimensions and finish shown on blueprint. Production requirements are 20 per hour. Electrical current is 220 volts, 60 cycle, 3 phase."

Note that I said "once in a great while."

Remember that the inquiry is important to the man who sent it. If he gives all the information we need, fine! If he doesn't give it, he probably doesn't realize it is needed before a final recommendation can be made. The answering letter or proposal should be tailored to suit the request, and not tailored to whatever whims we might have.

It is recognized that conditions vary widely, from simple standard machines that can be quoted in multigraphed form to highly specialized machines with elaborate tooling layouts that require a tailor made quotation. But the guiding light should be, "Does it give the customer what he wants and

needs? Is it the best silent salesman that I can prepare?

It is frequently necessary to make changes after proposals are written and after orders have been placed. These are not necessarily due to incompleteness. Any number of conditions may be responsible, such changes should be covered in writing, confirmed if verbally given, and in clear, concise and accurate form. This is another important phase of the written word.

As for government quotations, we all know they are in a class by themselves. A different set of rules is required for

Micro
Supreme
**LAY-OUT AND
IDENTIFICATION DYE**



13 COLORS

For Tool, Die, Pattern or Template layout on metal . . . Quick identification of bar stock, sheet, strips or parts . . . Shows up in sharp relief—dries instantly . . . Write for trial sample and circular.

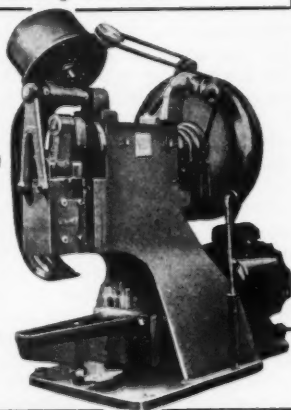
**MICHIGAN CHROME &
CHEMICAL COMPANY**

6340 E. Jefferson Ave. • Detroit 7, Mich.

SAVE TIME AND MONEY

This is the most modern time-saving eyelet attaching machine.

- Can be set for single and multiple eyelets.
- Will take all sized eyelets.
- Low maintenance.
- Raceways and tools changed in minutes.



EDWARD SEGAL

Mrs. of Eyelet Attaching Machines
25 Beekman St. N.Y.C. 7, N.Y.

OUR EFFICIENT TOOL DESIGNING

*means
better production
at a lower cost*

Efficient tool designing in post-war's competitive production is a "must". Our experience guarantees you tools—designed for economy of operation, resulting in your increased production at lower costs.

**COLUMBUS DIE • TOOL
and Machine Co.**

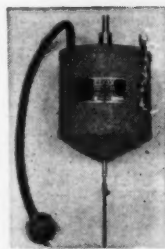
930 CLEVELAND AVE., COLUMBUS 1 OHIO

Low-Priced

**ELECTRICAL
Broken Tool
REMOVER**

Only \$95

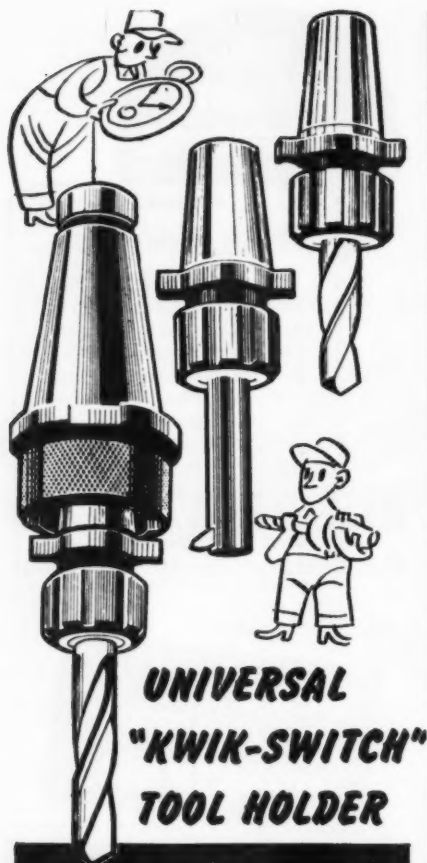
It's sensational — Every shop, every tool crib should have one. Removes broken tools and studs by electrical disintegration from a part being machined without damaging the part. Saves castings otherwise scrapped. Set it up on your drill press.



See Your Dealer or
Write Us Today.

ELOX

744 N. Rochester Road
Clawson, Michigan, U.S.A.
Phone, Detroit: Jordan 4-6173



**permits 10 second
tool changes
without
accuracy losses**

**UNIVERSAL
ENGINEERING CO.**

FRANKENMUTH 10, MICH.

quoting nearly every branch and division of the government.

In Conclusion: The proposal is one of our principal selling tools. As such it should be:

1. **Well designed**—that is, planned to fit the customer's needs yet conforming to your own good standards of business conduct.
2. **Properly Constructed**—in all details and adequately lubricated.
3. **In Operation**—it should be sharp and well pointed.
4. **After Delivery**—it should require a minimum of adjustment and service.
5. It should then **produce results**. End of Lecture No. 19.

GENERAL ELECTRIC SUGGESTION SYSTEM AWARDS IN 1948

A total of 17,629 employees of the General Electric Company received cash awards totaling \$277,218 during 1948 for suggested ideas leading to improvements in plant and office operations. A. D. Marshall, assistant secretary of the company, has announced.

Largest single award of \$2,285 went to Charles Bendig, an employee of the G-E Appliance and Merchandise Departments, refrigerator divisions at Erie, Pa., for an idea to improve the finishing operation on refrigerator cabinets.

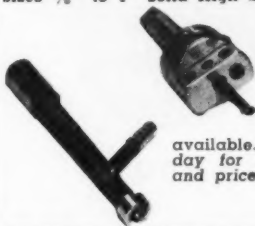
Second highest award of \$2,000 went to Arthur Scipione of the Apparatus Department's Fitchburg, Mass., plant for his idea for improving the method of fabricating nozzle boxes on superchargers for diesel locomotives.

Mr. Marshall, who is also chairman of the suggestion committee, said approximately \$2,500,000 has been paid by the company in suggestion awards since the suggestion system was adopted in 1906. Last year's awards equaled the previous peak year of 1943, he said, adding that the latter year probably reflected the stimulus growing out of the pressures of war and the heightened opportunities for making suggestions in connection with conversion processes.

"There is every indication that the suggestion system is gaining wider recognition," Mr. Marshall said. "More employees are benefiting from cash awards paid for suggesting improvements.

NOW! A FREER CUTTING BORING BAR

Without sacrificing body diameter, a freer cutting Boring Bar is made possible by greater diametrical clearance. Can be used as double end cutter where holes are to be reamed to size. Twice the amount of usable head having the same diametrical clearance. Standard sizes $\frac{1}{8}$ " to 1" solid High Speed Steel.



Two piece bars, if desired on $\frac{1}{2}$ " or larger diameters. Special sizes available. Send today for full details and prices.

A. B. CRALEY & SONS
CLEMENTON, N. J.



**"BUILT-IN"
FEATURE
Saves 50%
FLOOR SPACE**

Hammond
**NO-DUST
GRINDER**

- Requires only $6\frac{1}{2}$ square feet.
- Protects employees' health — and nearby machine tools from dust and grit. For 10", 12" and 14" wheels.



WRITE FOR CATALOG

Hammond Machinery Builders

1614 DOUGLAS AVE., KALAMAZOO, MICH.

STERLING DRILL GRINDER



CAPACITY:
 $\frac{3}{8}$ " to $2\frac{1}{2}$ " drills.
5" x 9" adjustable table.

MOTOR: $\frac{1}{2}$ hp,
3450 rpm.

NET WT: 250 lbs.

CRATED: 320 lbs.

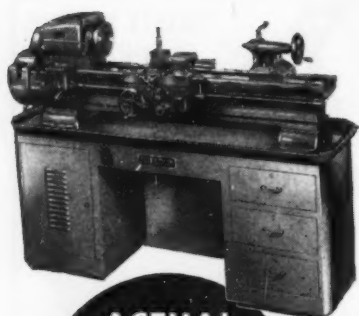
MCDONOUGH MANUFACTURING CO.
EAU CLAIRE, WISCONSIN, U. S. A.

BAUMBACH THE DIE SET AUTHORITY



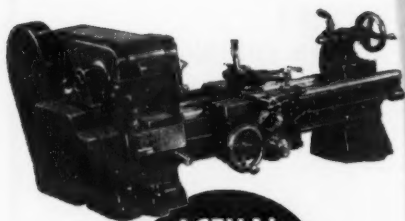
All Baumbach Die-Sets have demountable Leader Pins and Bushings. This exclusive feature permits removing Leader pins for machine work on the die shoe and assures reassembly without loss of alignment. A big time and trouble saver. Write for Catalog.

E. A. BAUMBACH MFG. CO.
1810 S. KILBOURN AVE. CHICAGO 23, ILL.



**ACTUAL
SIZE OF
HOLE THRU
SPINDLE**

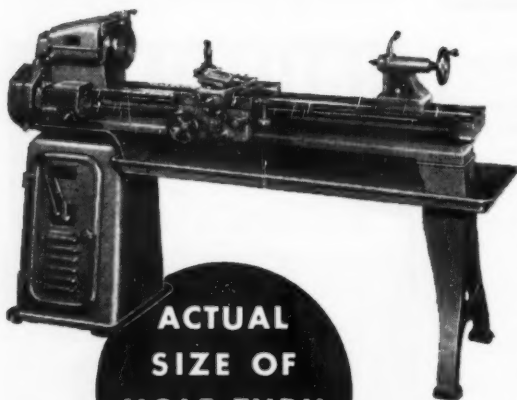
SHELDON
TS 56B
11 1/4" swing



SHELDON
L-44
10 1/8" swing

**ACTUAL
SIZE OF
HOLE THRU
SPINDLE**

**Large enough
for most work...**



**ACTUAL
SIZE OF
HOLE THRU
SPINDLE**

SHELDON
TU-1248P
13 1/8" swing

**Small enough to do
it profitably!**

Most lathe work is of relatively small diameters. Still much of it is done on large and costly lathes with a resulting loss of profit from: High power cost, floor space and overhead loadings. Such "wastes" can be switched to profits by using modern Sheldon Precision Lathes. Lighter, faster, easy to operate with "Zero Precision" Taper Roller bearings (the most accurate made) they hold close tolerances or stand up to continuous high speed operation at full capacity.

Built in a modern machine tool plant that is equipped with the finest lathe building equipment, they are moderate in price, hence pay out in a very short time.

SHELDON MACHINE CO. Inc.

**Manufacturers of Sheldon Precision Lathes • Milling Machines • Shapers
4242 N. KNOX AVENUE • CHICAGO 41, ILLINOIS. U. S. A.**

NEW in METALWORKING

THOMPSON HEAVY-DUTY HYDRAIL SURFACE GRINDER

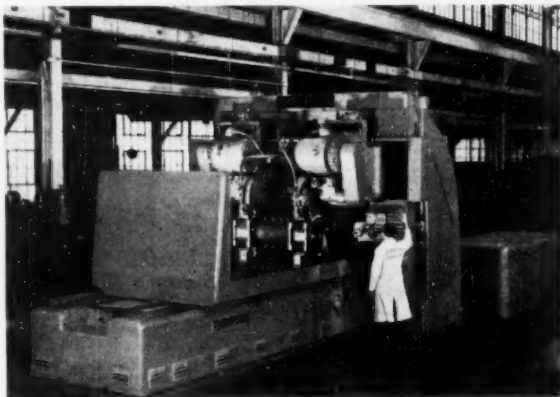
The Thompson Grinder Company has just announced the development of a complete new line of machines to be known as Thompson Hydrail Surface Grinders. These large machines are especially designed to handle large work from rough to finish up to 48" both vertically and horizontally, with a maximum table length up to 240". The wheel head or heads are mounted on a massive bridge for rigidity, and grind either vertically or horizontally depending on the application. This new Thompson Hydrail machine will replace many operations formerly done on planers and at lower cost, according to the manufacturers.

The machine illustrated at the right has two heads each operating independently, or together, according to the specifications of the English company ordering. The particular application in this case was the grinding of wear strips in the horn guides of bearing and wheel casings. The clearance is sufficient to grind the housing with the train wheels in position in the housing, in order to permit time saving in railroad maintenance shops. It is possible for two operators to control the machine, grinding two horn guides simultaneously.

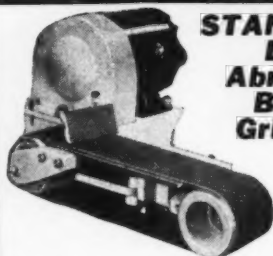
Other Hydrail machines are on the production line for aircraft companies and

applications are almost unlimited where large work is involved which was formerly done on planers. All cycles of operation are completely automatic, although hand control is provided. Table speed is adjustable from 10 feet to 100 feet per minute. The Hydrail is furnished with 36" and 48" vertical heads and 36" and over horizontal heads. The entire machine weighs over 65 tons.

The close-up picture shows two vertical grinding heads in position, with their vertical controls and dial settings. Horizontal heads, or one horizontal and one vertical head, are also available. One head is usually all that is required. Note



The size of the Hydrail Surface Grinder, above, is 72" x 36" x 120". Other sizes and capacities are available.



STANDARD D-4 Abrasive Band Grinder

Famous
for
Stamina

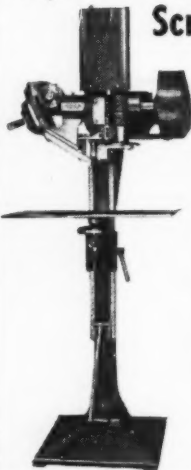
This new, streamlined bench type grinder assures fast, quality finishing on metals, plastics, wood, fibre... at low cost. Built to machine tool specifications, Standard D-4 is equipped with improved band tension control and specially designed protective motor hood 4x36 1/4" band. The ideal portable unit.

OTHER STYLES AND SIZES IN NEW
MANUAL ON FINISHING—WRITE TODAY

WALLS SALES CORP.

306 E. 38th St., New York 16, N. Y.

Reynolds - Magazine Feed Screw Driving Machines



*
Simplify and
Speed up those
high production
Assembly jobs.

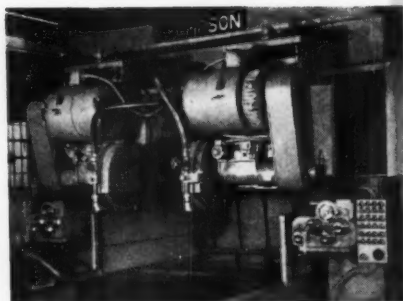
A complete line of
production type
screw driving
machines for every
application.

WRITE FOR
CATALOG

COOK & CHICK CO.

640 S. MILLER ST.

CHICAGO 7, ILL.



the full push-button control, as well as the manual control on both sides of the table.

Complete specifications and operational information will be provided upon request. Write:

The Thompson Grinder Co., Dept. BB
Springfield, Ohio

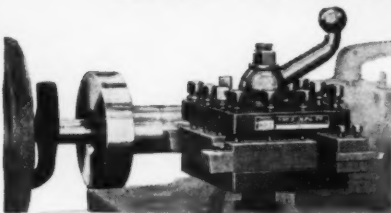
HERCULES BENCH SHEAR AND ROD CUTTER

The new Hercules Model O Shear and Rod Cutter is a general purpose tool that can be adapted for production purposes as well as for making samples and templates in tool and die work. The device shears sheets and bar stock up to 1/16" thick, any length and width; it cuts rods



square and accurately, never leaving burrs, in diameters up to 1/4". It is provided with an automatic ejector gauge which can be adjusted for cutting rod lengths from 1" up; it automatically

ENCO TURRET TOOLPOSTS REDUCE PER PIECE COSTS ON ENGINE LATHE WORK



Model HD-2 shown mounted on heavy duty 16" lathe in large midwest machine builder's plant. Part being machined is expansion head made of 8640 sulphite steel forging. Note unusual tooling setup. A 50% saving in production time was reported on this job.

Write for catalog No. 48 which shows typical application photos of many of Enco's 35 Models on actual jobs. When writing give lathe name and swing, also maximum tool size to be used.

SPECIFICATIONS OF A FEW OF MANY ENCO TURRETS

Model No.	HD-2	6-S	4½-R	4½-S	3½-R	3½-S
Suggested Lathe Size	16" to 24"	14" to 20"	15" to 19"	13" to 16"	12" to 15"	10" to 13"
Tool Block Size	6½" sq.	6" sq.	4½" sq.	4½" sq.	3½" sq.	3½" sq.
Solid Tool Capacity	1½"	1¼"	1"	¾"	7/8"	1/2"
Price	\$138.50	103.50	66.50	53.50	46.00	36.75

Also Mfrs. of Enco Hexturret Bed Turrets and Tailstock Turrets for 9" to 18" Lathes.

ENCO MANUFACTURING CO., Dept. 269, 4524 Fullerton Ave., Chicago 39, Ill.

ejects cut rods. The tool can also be used to cut circles from 1½" to 10" diameter. As a nibbler, it notches out templates and other odd shapes.

The interchangeable shear blades are made of high grade tool steel. The housing, base, hand lever etc. are made of aluminum alloy, even more durable than cast iron. The tool weights approximately six pounds, and is easy to carry for use on the job.

Hercules Models No. 1 and No. 2 are also available to shear sheet and bar stock up to 3/16", and to cut rods up to ½" diameter. For complete information on all Hercules models, write:

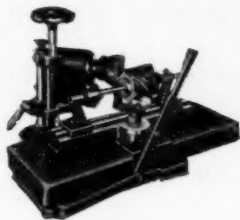
**Manufacturers Products, Dept. BB
Crest Ave.
East Haven, Conn.**

NEW TOOL GRINDER HAS WIDE VERSATILITY

A new tool and cutter grinder which stresses unusual versatility has recently been introduced to the metal working industry by Carlson Brothers Tool & Engineering Co. The new tool, designated as the Carlico Universal Tool and Cutter Grinder, can be used for grinding cut-

ters, reamers, facing tools, slitting and screw slotting saws, and similar small tools.

The machine is equipped with a special General Electric motor, rated at ¼ h.p., 7500 r.p.m. It operates on both a.c. and d.c. current. A special indexing head for grinding facing cutters and end mills is also available for this unit. The spindle

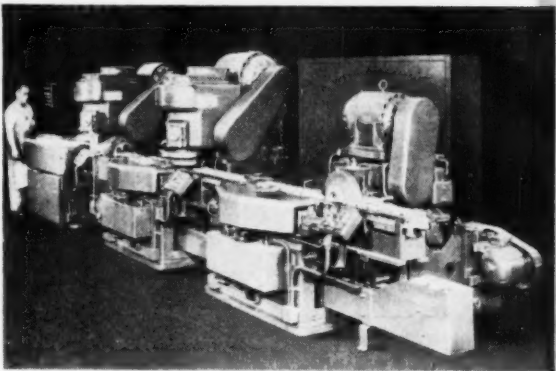


in the indexing head is equipped with a No. 7 Brown & Sharpe taper. A selection of suitable grinding wheels for the unit is carried in stock. For further particulars on the Carlico Universal Tool & Cutter Grinder, write:

**Carlson Bros. Tool & Engineering Co.
2647 Coyle Ave., Dept. BB
Chicago 45, Ill.**

SUNDSTRAND AUTOMATIC TRANSFER RIGIDMIL

The new Automatic Transfer-type Rigidmil built by the Sundstrand Machine Tool Co. mills the top, bottom and both sides of cylinder heads. The machine consists of three milling stations, one turn-over station, an idle station and loading and unloading stations. All stations can be controlled from the master control button panel, or individually from the station button control panels. The cylinder heads are shuttled from station to station by the return movement of the milling heads, making it unnecessary to have a separate shuttling device. A motor driven chip conveyor removes the chips from the machine.



The operator needs only to locate the cylinder heads on the loading station and press the cycle start button, after which, all movements are automatic. Each milling head has an automatic cycle of

rapid approach, feed and rapid return. As the heads rapid-return, each one moves two work pieces—the finished piece out ahead of the cutter (making cutter relief unnecessary), and a rough piece into milling position. All traveling heads are intertimed so that none will

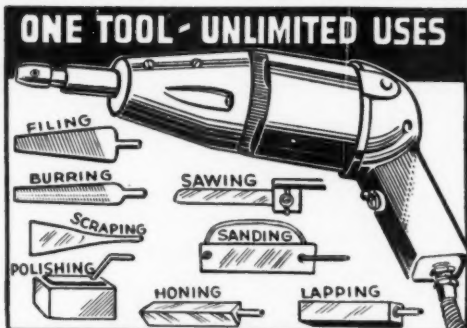
EXPEDITE FINISHING OPERATIONS with

RECIPROCATING ACTION TOOLS

Portable—Light in Weight

Easy to Use—A Real Time

Saver in Any Shop.



Many hand finishing operations can now be done quicker, easier and more accurately with these electric tools. Deliver 1000 PUSH-PULL strokes per minute. Fixed strokes are either $\frac{1}{8}$ " or $\frac{3}{8}$ " long. Operate on 110 Volts AC or DC.

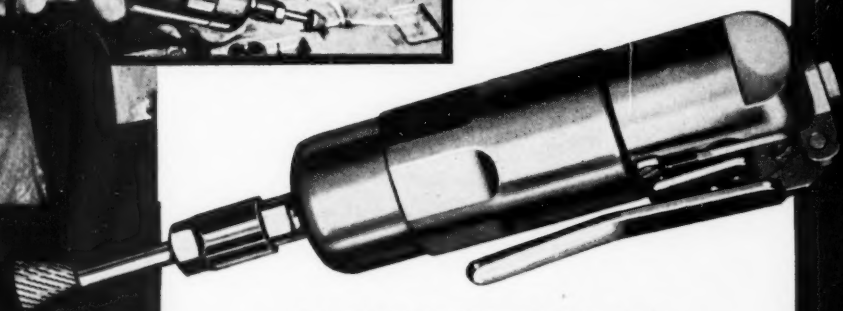
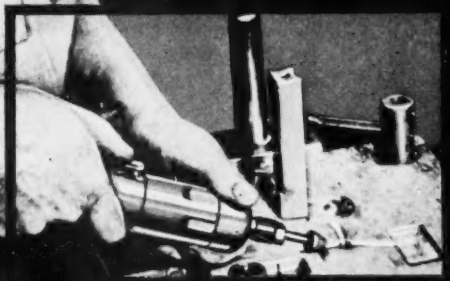
Write for Catalog.

ACME TOOL COMPANY

71 WEST BROADWAY

NEW YORK 7, N. Y.

SKIL Pneumatic Tools



OTHER
SKIL Pneumatic Tools
for fast work include:

Available with $\frac{1}{8}$ inch collet and Jacobs chuck for drilling. A tool post holder is also available for use in a lathe.

Tools
PNEUMATIC

REDUCE INVENTORY

Follow the lead of wise planners. Don't tie up money in big stocks of wheels.

RAPID SERVICE

Let us hold your stock—without heavy investment on your part. Through the increased facilities of our modern new plant, we are in position to give you the finest service in the industry.

**COME TO
MOUNTED
WHEEL
HEADQUARTERS**

AVOID OBSCOLESCENCE

by reducing inventory. Get your wheels as you need them, made to your particular specifications.

This
the
Grin
a c
F
are
ac
RE
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STARTLING ADVANCE BETTER FINISHES

FV BOND

This improved bond is starting another trend in the abrasive industry. Used only in Chicago Grinding and Mounted Wheels—the result of half a century testing and experience.

F. V. Bonded Wheels will produce finishes that are superior and have a lower RMS without sacrificing production.

FREE ENGINEERING SERVICE. Let us help with your grinding problems. Send for Engineering Data Sheet making it easy for you to submit information from which we can recommend the wheel to do your job best.

CHICAGO WHEEL & MFG. CO.

Makers of Quality Products since 1895

1101 W. Monroe St.

Dept. HB

Chicago 7, Illinois

☐ NAME _____
☐ ADDRESS _____
☐ CITY _____
☐ STATE _____
☐ ZIP _____

BAKER

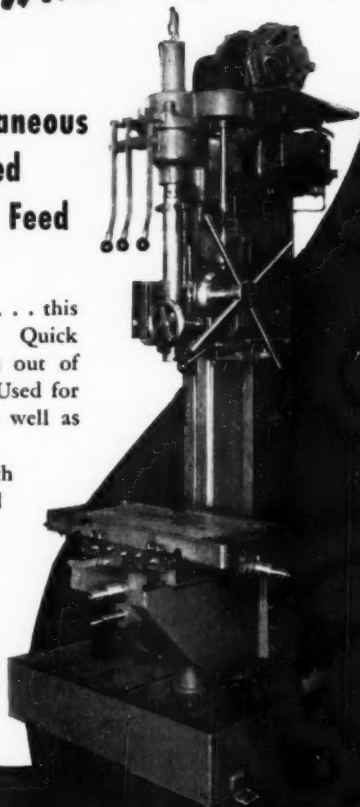
UNIVERSAL QUICK CHANGE DRILL

... with **12** Instantaneous
Changes of Speed
and with Selective Feed

It's *heavy, rigid and versatile* . . . this Baker Drill of the Universal Quick Change type. Assures maximum output of twist drills up to 1½" diameter. Used for heavy duty boring and facing as well as for drilling.

Shown here is Model 150 with standard compound table. Speed and feed changes convenient to operator. Baker-built dependability . . . engineered to do the job *better* and help *increase productivity*.

Write for more details.



BAKER BROTHERS, INC., Toledo, Ohio

DRILLING, TAPPING, KEYSEATING and CONTOUR GRINDING MACHINES

start the rapid-return or shuttling movement until all are ready, thus making a pile-up of work pieces at any one station impossible.

At the first milling station, a 25 h.p. traveling head, with one vertical and one horizontal spindle, mills the top and the left side (accessory mounting bosses). At the turn-over station, the piece is turned 180°, making the bottom side up. At the next milling station, a 40 h.p. traveling head with one vertical spindle, mills the bottom (contact face) of the cylinder head. From the second milling operation, the piece goes into an idle station. This station is necessary to allow room for movement of the two traveling heads on either side.

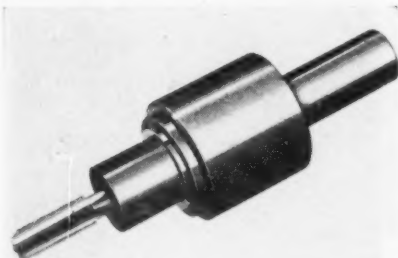
The last milling station has a 15 h.p. traveling head with one horizontal spindle that mills the right side (manifold face). Now with all four sides milled, the piece moves onto the unloading station and the outgoing conveyor. A safety switch at this station prevents another cycle of operation until the finished piece has been removed.

The manufacturer will supply specifications and further data upon request. Write:

**Sundstrand Machine Tool Co., Dept. BB
Rockford, Ill.**

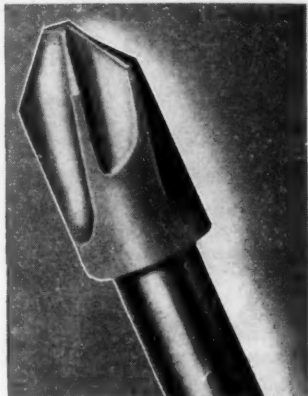
EMPIRE TAPE HOLDER REDUCES SET-UP TIME

A new floating-releasing tap holder is announced by the Empire Tool Co. This new development incorporates a parallel and angular float and a releasing clutch and pull-out. It not only corrects for



parallel and angular misalignment to assure accurately tapped holes, but it will not bind or freeze under tension or compression; it will float a tap out of hole freely. The releasing clutch is designed to prevent wear and assure positive sensitive release. The amount of float is

SOLD THRU LEADING SUPPLY HOUSES



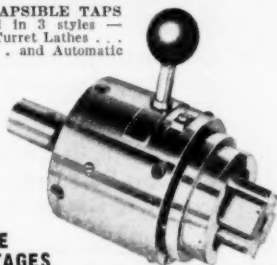
GROBET CHATTERLESS COUNTERSINKS

Six staggered cutting edges give shearing cut that eliminates all chatter. Send for catalog C-C1.

GROBET FILE CO. of AMERICA, INC.
421 Canal Street N. Y. 13, N. Y.

THE RIGHT COLLAPSIBLE TAP FOR YOUR MACHINE

M. E. C. COLLAPSIBLE TAPS are manufactured in 3 styles — namely for . . . Turret Lathes . . . Drill Presses . . . and Automatic Machines.



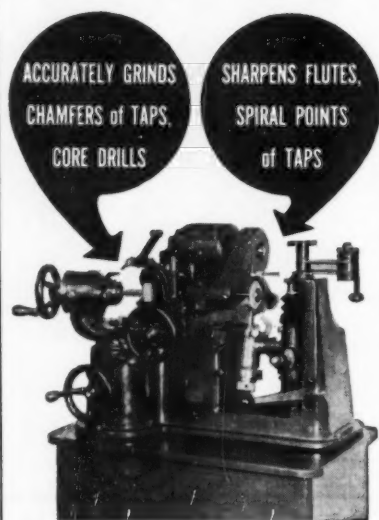
CHECK THESE M.E.C. COLLAPSIBLE TAP ADVANTAGES

- Tap Holes as small as 15/32" diameter
- Easy to Operate
- Sturdy, Simple Construction
- Positive in Collapsing
- Designed for Maximum Chaser Life
- Ideal for Bottom Tapping
- Cuts Either Straight or Taper Pipe Threads
- Chasers Easily Changed
- No Reversing Spindle
- Reduces Machine Maintenance Costs
- Eliminates Scrap

Write for complete Catalog No. 46

MANUFACTURERS EQUIPMENT CO.
3025 W. ATKINSON AVE. MILWAUKEE 9, WIS.

THE New MODEL 1100 HYBCO TAP GRINDER



- Capacities No. 2 Machine Screw to 1½" Hand Taps.
- All Settings Adjustable To Give Any Angle — Relief — Hook.
- Taps Held In Precision Collets Can Be Sharpened After Center Is Destroyed.
- Standard Motor — Any Current Specification.

Representatives in Principal Cities

HENRY P. BOGGIS & CO.
710 East 163rd Street
Cleveland 10, Ohio

adjustable. The tool can be changed from right to left hand by loosening the pull-out lock screw in shank, sliding the complete float and release mechanism out of the housing and turning the right or left hand dog 180°.

The manufacturers claim for this device a reduction of setup time and longer tap life, with a lessening of tap breakage and elimination of bell-mouthed holes. The holder is made for use on all makes of turret lathes and automatics.

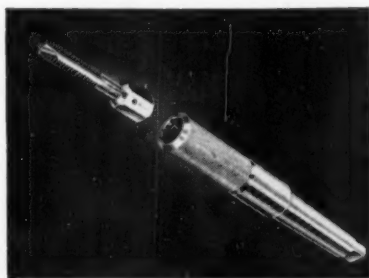
The clutch mechanism is a new wear-resistant type which automatically spaces itself upon releasing, leaving sufficient clearance between driving and driven members to prevent hammering of the clutch parts when the tap revolves. The clutch parts are made from heat-treated alloy steel, ground to close tolerances.

The tap holder is made in 2½" size to receive taps from ½" to 1¼" sizes. The shank is 1½" x 4". It is possible to take a tap as small as ⅜" by using a special collet. Write for further data to:

Empire Tool Co., Dept. BB
8774 Grinnell Ave.
Detroit 13, Mich.

NEW AID TO POWER TAPPING

The new Dahlstrom Tap Chuck meets the needs of the occasional power tapping job. Developed by a lathe operator, it does away with the "center and wrench" method of tapping on a lathe or drill press. Since the tap floats, the tool's threading accuracy is increased. Included are seven tap adaptors in size from 8-32 to ½". The adaptors are quickly interchangeable.



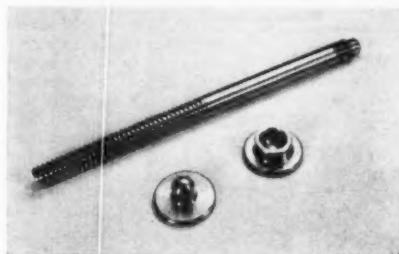
The Tap Chuck is made in numbers 2, 3, or 4 Morse taper. Overall length is 8-5/8". For complete specifications, write:

Dahlstrom Manufacturing Co.
2506 Larpenteur Ave., Dept. BB
St. Paul 8, Minn.

MACHINED PARTS ARE NOW MADE FROM NEW STAINLESS STEEL

Precision parts, such as valve trim and many types of fastenings, are now being commercially produced from a super corrosion-resistant alloy called Carpenter Stainless No. 20.

The machining characteristics of the alloy are reported to be very good, the valve parts illustrated below having been



machined at speeds generally used for Type 316 stainless steel.

Until about a year ago, when Carpenter Stainless No. 20 was introduced in wrought forms, the alloy had been avail-

able only in the cast form known as Durimet 20, manufactured by The Duriron Co., Inc., Dayton, Ohio. Because of its excellent resistance to the corrosive effects of sulfuric acid and other highly corrosive agents, Carpenter Stainless No. 20 is used for component parts which must have a life span equal to that of a cast assembly.

Carpenter Stainless No. 20 in its wrought forms is now being commercially produced in the forms of bar stock, wire, strip, tubing, pipe, sheet and plate. The type analysis of the alloy is as follows:

Carbon	.07% max.
Manganese	.75
Silicon	1.00
Chromium	20.00
Nickel	29.00
Molybdenum	2.00 min.
Copper	3.00 min.

For information about the alloy's corrosion-resistance and fabricating characteristics, address:

The Carpenter Steel Co.
Dept. 12C-2
Reading, Pa.



Kutmore
HIGH SPEED
ADJUSTABLE
HOLLOW MILLS

Designed for modern production requirements. Saves time, effort and motion. Has a two way micrometer adjustment with locking device to assure absolute cutting accuracy.

Kutmore Hollow-Mills may be had with straight or taper shanks, high speed or Carbide Tipped blades. Insist on Kutmore for accuracy, speed and economy. Prompt delivery. Write for Catalog No. 15.

Carl Wirth & Son
1625 CLINTON AVE. N.
ROCHESTER 5, N. Y.

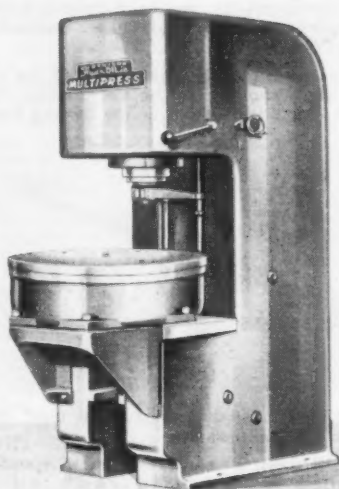
NEW DENISON 25-TON OIL-HYDRAULIC PRESS

Fast action with high-tonnage pressures under accurate control are among the advantages of the new 25-ton Multipress oil-hydraulic press introduced by The Denison Engineering Company. Speed and control features in this floor model are said to be available for the first time in a press of this tonnage.

The 25-ton Multipress extends the range of standardized oil-hydraulic presses in this line beyond the smaller capacity units. It has a 15" stroke, 25" daylight opening, and a 12" throat depth, providing more die space in keeping with their higher tonnage capacities.

The approach of the ram to work is variable and can be preset at any speed desired up to 530 inches per minute. Other operational factors that can also be preset include: the ram stroke length, pressing speed and ram pressure. Uniform pressure application for every work cycle of the ram is obtained regardless of variations in dimensions of parts being processed.

The adjustable characteristics of this unit permit unskilled operators to turn out production quality parts at full speed. The press may be equipped with either



WHERE **DEPENDABILITY** IS A MUST

MARSHALLTOWN THROATLESS SHEARS ARE YOUR LOGICAL CHOICE

Cuts **any** shape—**quick!** Saves time, money—**boosts** production. Cutting speed 6' to 9' per minute.

Write for details

MARSHALLTOWN MFG. CO.
910 E. Nevada St. Marshalltown, Iowa



dual hand lever, single lever, foot pedal or electric push button controls. It can also be operated with automatic valve controls for single or continuous cycling, or vibratory repeat strokes. Automatic ram cycling also may be used in conjunction with variable speed approach, adjustable pressures, and interlocking hydraulic accessories. Added advantages include inching control of ram for quickly locating dies and tooling during set-up periods.

A large, 33" diameter hydraulic index table may be installed as optional equipment. The Denison table accessory moves parts under the press ram automatically, and provides indexing for either 6 or 12 stations. Parts can be loaded onto the table stations at front of the press, eliminating waiting periods for completion of work cycles.

For complete specifications, write James M. Gallant, Advertising Manager:
The Denison Engineering Co.
 1160 Dublin Road, Dept. BB
 Columbus 16, Ohio

HIGH FREQUENCY WELDING TORCH APPROVED BY F.C.C.

Federal Communications Commission approval has been given to this new torch to be used for inert gas arc welding with the approved Sureweld Gasarc high frequency welder, made by the National Cylinder Gas Company. The Gasarc torch utilizes coaxial cable and a built-in tuning device to maintain freedom from interference while carrying high frequency energy at 27,120,000 cycles per second from the oscillator to the welding arc. A flexible plastic cable



provides passage for welding current, inert gas, high frequency current, and a circulating water supply for cooling the electrode holder.

Further specifications will be sent upon request to the manufacturer. Write:
National Cylinder Gas Co.
 840 N. Michigan Ave., Dept. BB
 Chicago, Ill.



**50 YEARS
 EXPERIENCE
 BUILT INTO
 REID
 GRINDERS**



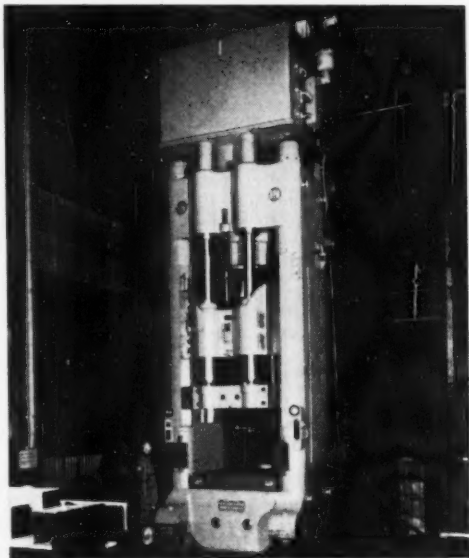
REID BROTHERS CO., INC.
 Beverly, Massachusetts
FORWARD GRINDER CATALOG

REID BROTHERS COMPANY, INC.
 BEVERLY - MASSACHUSETTS

2000-TON DOUBLE-ACTION PRESS MADE BY H.P.M. CO.

This giant 2000 ton double-action hydraulic press, designed and built by The Hydraulic Press Manufacturing Co., will soon be turning out sheet metal stampings in France. This press represents one of the largest all-hydraulic units ever built for export. It weighs 373,000 pounds and when installed will tower 29 feet from floor level to the top of the press. A pit 10 feet deep will be required to install that part of the press normally located below the floor level. The press is capable of drawing sheet metal parts to a depth of 24". Dies up to 72" square can be installed in the press. In addition to the punch carrying slide, which has a capacity of 2000 tons, the press is equipped with a 600-ton hydraulic blank-holder and a 400-ton hydraulic die cushion, the latter being located in the press bed.

The main slide is actuated by a double acting compound ram (with an internal booster ram) providing two selective forward areas for medium and high pressure work, either in sequence through each cycle or independently. This doubles the pressing speed up to 1000 tons, then an automatic shift-over to the slower speed is made until the maximum desired pressure is reached, at which point the press automatically reverses. This feature is beneficial when drawing parts which require only high pressure at the bottom of the stroke. Also, on lighter draw work the higher speed pressing cycle can be used independently, thus making the press versatile for both light and heavy work.



A time-saving feature of the blankholder is that pressure can be adjusted independently at the four corners of the blankholder slide. This feature is useful when drawing irregular shaped parts where the blank must be held more firmly at certain points on the periphery of the blankholder draw ring.

The press operator is protected by a curtain of light safety control which basically involves the use of the "electric eye" light beam which projects across the front of the press at the operator's working level. The press will not op-

WALTON TAP EXTRACTOR



THE FINEST TOOL FOR REMOVING BROKEN TAPS

● Removing broken taps need not call for the purchase of expensive equipment. Walton Tap Extractors have been used for years by toolmakers and mechanics all over the world. They are easy to use, economical, and fast. Purchase from your dealer, or write us for Folder No. 12 and details of free trial offer.

THE WALTON COMPANY
HARTFORD 10, CONNECTICUT

erate if the light beam is broken.

The press is equipped with a mechanical knockout in the main slide. Hydraulic power for press operation is generated by an H-P-M variable delivery, radial piston type hydraulic pump which has a displacement capacity of 185 gallons of oil per minute at 2500 pounds p.s.i.

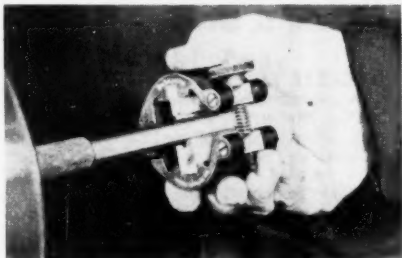
The press uses the H-P-M closed circuit "Fastraverse" operating system, which results in a high speed cycle with shockless reversal. An automatic slowdown prior to die contact with the metal blank to be drawn eliminates impact shock resulting in longer die life and fewer rejects. Complete data on this unit will be supplied upon request, by writing:

Hydraulic Press Mfg. Co., Dept. BB
Mount Gilead, Ohio

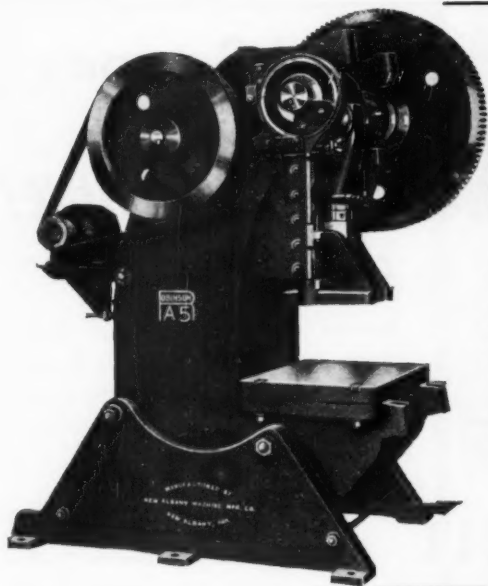
M & M OFFERS DELAPENA EXTERNAL HONE

The Delapena External Hone is an application new to the American metal working industry. Its purpose is to produce precision external diameters quickly, and at low cost. The hone is designed for correcting ovality, removing taper,

and producing micro-finishes. It consists simply of a body member into which is readily fitted one of a series of guide blocks, together with stone holders to suit the diameter of the work being honed. The body member consists of two hinged parts, held apart by a spring against an adjustable stop or control



screw. Roughing, finishing and polishing stones are supplied for the honing of the work. The stones are mounted on holders which may be readily mounted in the hone body. To insure proper alignment of the honing stones with respect to the guide block, a truing stick is provided.



INCLINABLE PUNCH PRESSES SERIES A

ROBINSON

A-5 Motor Drive 88 Ton Geared Inclinable Punch Press with Anti-Backlash Brake to take care of kick back when using air cushion and heavy spring pressure pads. Timken bearings in clutch wheel and back shaft bearings. Available in 14, 22, 32, 56 and 88 ton capacity. Literature on request.

**New Albany Machine
Mfg. Co.**

New Albany, Ind.

A complete range of Delapena External Honing Equipment, covering all diameters between 1/16" and 1" is normally carried in stock, with replacement parts for all sets. For further information, write for Bulletin No. 300 to the exclusive representatives in the United States for Delapena & Son, Ltd., Cheltenham, England:

The Motch & Merryweather Mach'y Co.
715 Penton Bldg., Dept. BB
Cleveland 13, Ohio

BUCKEYE AIR-DRIVEN BELT SANDER

A new air-driven belt sander, adaptable for metal work on all types of surfaces, both concave or convex, is announced by Buckeye Tools Corporation.

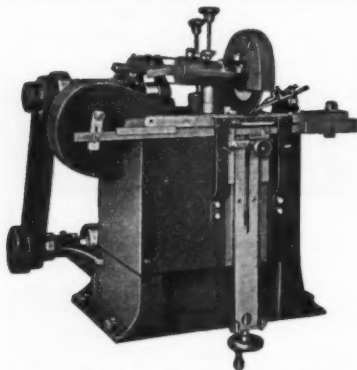
The sander is a new addition to the Buckeye Stream-Power line of portable air tools. It is applicable to all types of metal finishes, both sheet metal and solid castings, and to all types of materials in iron, steel, brass, bronze, solder, aluminum and magnesium. It is also suitable for finishing and sanding wood products.

Comprehensive tests were made on the Buckeye Belt Sander in the automotive industry and on the basis of successful results, production of the new tool



has already begun. Complete information on the new sander may be obtained upon request. Write:

Buckeye Tools Corp., Dept. BB
21 W. Apple St.
Dayton 1, Ohio



Wardwell Model EC Combination Grinder

The only single unit grinder adaptable for hack, band and circular saws that does not depend on the shape of the grinding wheel to form the shape of the tooth. This unique feature enables operator to grind a variety of blades without dressing or changing wheels.

Grind 3 types of saws ON ONE MACHINE!

Circular - Hack - Band

Increase the cutting hours of your blades over 100%! Wardwell E. C. Grinder sharpens old metal saws so that they actually cut better than new.

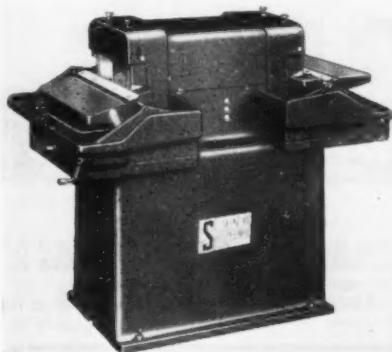
Write for details

THE WARDWELL

MANUFACTURING CO.
3165 Fulton Rd. Cleveland 9, Ohio

NEW CARBIDE TOOL GRINDERS

The Standard Electrical Tool Company announces the development of two Carbide Tool Grinders for wet or dry grinding. These machines feature substantial construction for vibration-free, accurate and volume grinding and are v-belt motor driven. They are now available in 1 and 3 h.p. units. Motors are reversible and totally enclosed. 3-button push button control and reversing magnetic starter have overload and under-voltage protection.



The work tables are quickly adjustable to any angle (15° above, 30° below the horizontal) with an easily read graduated dial. The table assembly, guard and splash pan are adjustable through screw feed to compensate for wheel wear. Each table is equipped with a replaceable steel wear plate.

Adjustable nozzles are provided to supply sufficient coolant for wet grinding. Conversion to dry grinding may be accomplished simply by closing the coolant valves, opening the gates at each wheel and connecting to the exhaust system at rear of grinder.

The base incorporates coolant reservoir, settling chamber and drain for cleaning and flushing. The machine is further equipped with a holder and a guard design with adjustable splash guards for spray control.

Complete information may be obtained from Bulletin ML3, just off the press. Write:

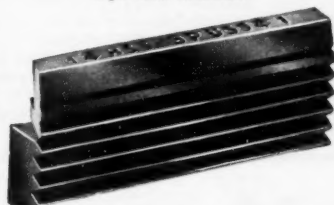
The Standard Electrical Tool Co.
2486 River Road, Dept. BB
Cincinnati 4, Ohio

DIE HEADS Chasers To Fit Any Type of Die Head Also Solid Taps

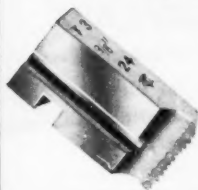
can be ordered on one purchase order. This eliminates any chance for error when special threads are required. We offer a Hygrade Product with prompt deliveries and a guaranteed saving.



Any form of thread can be furnished on taps and chasers.

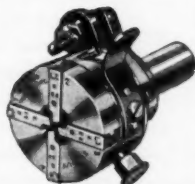


Tangent Chasers can be furnished in cut or ground threads.



Radial chasers can be furnished in milled, tapped or ground form. Circular chasers furnished in ground form only.

The most complete line of threading tools offered by any one company. Multiple thread milling cutters — shell or shank type.



Write for Catalog.

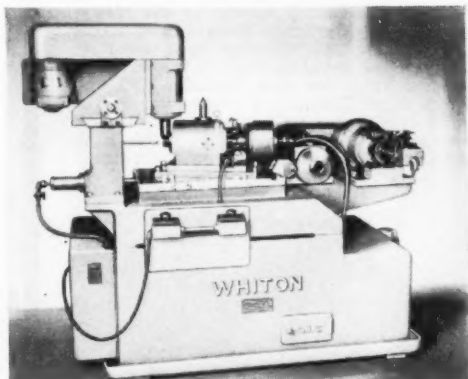
The CHASO TOOL CO., Inc.
Royal Oak, Michigan

WHITON SPECIAL PURPOSE MILLING MACHINE

The Whiton Machine Co. announces its new special purpose high-production Milling Machine. Although the machine was primarily designed for cutting bevel and spur gears and pinions, many other milling operations can be performed. For example, work requiring one or more slots milled on the face or outside diameter, work requiring hex, square or more sides to be milled, can be efficiently done.

The machine has a vertical spindle mounted in anti-friction bearings, individually motor driven through V-belts which allows the use of carbide cutters when available. The spindle unit is adjustable both horizontally and vertically.

The table is erected on hardened and ground ways and is actuated by a combination of air and cam to impart the proper rapid advance to and from the cutting position and to produce the proper feed for the cut. Where necessary, the cam can be arranged so that in feeding



onto the work a constant area of cut can be maintained to remove a constant cubic inch of stock.

Attached to the table is a work spin-

14 NICHOLSON EXPANDING MANDRELS REPLACE 209 SOLID ARBORS

Widely used for turning, milling and grinding, Nicholson expanding mandrels frequently demonstrate that operations can be completed in less time than was formerly consumed in looking for or turning a solid arbor. Two types for all bores $\frac{1}{2}$ " to 7"; square, hexagonal broached as well as round holes. Hardened tool steel.



Sold singly or in sets. The standard in shops the nation over.

Bulletin 1043 shows how to save set-up time, promote precision with Nicholson mandrels.

W. H. NICHOLSON & CO.

117 OREGON ST. WILKES-BARRE, PA.

Steam & Air Traps • Control Valves • Expanding Mandrels •
Arbor Presses • Welded Floats

dle in a housing capable of swiveling to mill any angle up to 90°. Spindle indexing to suit the work is accomplished by means of index plates activated and locked into position by an air cylinder. Indexing is extremely rapid and timed to occur at the end of the stroke. Work is normally held in the work spindle through the action of a collet operated by a rotating air cylinder. Upon completion of the operation, work is automatically ejected into a chute. The operator places the piece in the collet and presses two buttons, one of which automatically clamps the work, the other of which starts the machine through its cycle.

The new unit takes work up to a capacity of 8" in diameter. Cutter speed with high speed cutters is 125 s.f.p.m. With high speed steel cutters, the feed is .003" per tooth, variable to suit the work. For complete data, write:

Whiton Machine Co., Dept. BB
New London, Conn.

REVODEX DIRECT READING DIAL

A simple direct reading dial for use on all small and medium size lathes, milling machines and other machine tools, is

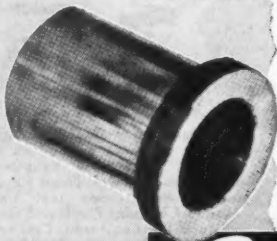
announced by Van Dyke Instruments, Inc. The Revodex dial consists of two inter-gearred dials: the first reading in thousandths of an inch, is comparable to the standard dial on most machine tools. The second dial reads in tenths of an inch and indicates the actual number of revolutions of the first dial. In



use, it saves time by relieving the operator from mentally adding the number of complete revolutions and also eliminates the necessity of frequent micrometer checks. The Revodex speeds up dial setting, insures accuracy, reduces work spoilage and provides a constant



You're a Production Winner with **Economy** Drill-Jig Bushings and Gages



Yes, they're in stock, ready to go out to you — all A. S. A. standard types and sizes. You can also get fast service on new gages or gages salvaged by hard chromium plating . . . precision-finished, durable. Write for bulletin and price list.

Economy TOOL & MACHINE CO.

1827 SOUTH 68th STREET • MILWAUKEE 14, WISCONSIN

record of the total feed from zero position, according to its manufacturer.

The Revodex Direct Reading Dial is adaptable to all shaft diameters from $\frac{1}{4}$ " to $1\frac{1}{16}$ ". Installation is merely a matter of removing the present dial from its shaft, and replacing it with the Revodex. The dial diameter is $1\frac{1}{2}$ " by $\frac{3}{4}$ " thickness. Graduations are machine cut, widely spaced for ease of reading. A thumb screw permits instantaneous zero adjustment.

The Revodex is suitable for use on all equipment employing screw feed travel where accurate cutting tool adjustments or precise table movements are essential. Circulars are available upon request to the Sales Office:

Van Dyke Instruments, Inc., Dept. BB
952 S. Crenshaw Blvd.
Los Angeles 6, Calif.

ABRASIVE SAW BLADES OF TOUGH BOND HAVE LONG LIFE

A tough, new bond has been developed especially for abrasive saw blades to be used in portable hand saws. Due to special formulation, the blades are said not to break at the end of the row. Furthermore, it is stated that they will stand up

at the corners and give long life. They are excellent for cutting through old mortar, removing filler, tuck pointing and preparation for tuck pointing. The same



type of abrasive saw blade can be used for scoring, cutting concrete and all types of stone. Write for complete details to:

Chicago Wheel & Mfg. Company
1101 W. Monroe St., Dept. BB
Chicago 7, Ill.

HERCULES #0 BENCH SHEAR and ROD CUTTER

- SHEARS SHEET AND BAR STOCK UP TO $\frac{1}{8}$ " THICK, ANY LENGTH AND WIDTH
- CUTS RODS SQUARE, WITHOUT BURRS, UP TO $\frac{1}{4}$ " DIAMETER
- NOTCHES OUT TEMPLATES AND OTHER ODD SHAPES
- CUTS CIRCLES FROM $1\frac{1}{2}$ " TO 10" DIAMETER
- AUTOMATICALLY EJECTS CUT RODS

SOME TERRITORIES OPEN FOR MFG. REPRESENTATIVES

Mfg. Since 1912
Now Improved!

Formerly
\$40



NOW ONLY
\$34.95

ATTACHMENTS
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EXTRA ATTACHMENTS

AUTOMATIC
EJECTOR
GAUGE



NIBBLER



CIRCLE
CUTTER

A general purpose tool for production purposes as well as for making samples & templates. Never leaves burrs. Shear Blades are of high grade tool steel. Made of aluminum alloy, 3 times as durable as cast iron: Cuts rods with one stroke. Weighs 6 pounds.
If Your Dealer Cannot Supply You, Write Direct.

MANUFACTURERS PRODUCTS CREST AVE., EAST HAVEN, CONN.

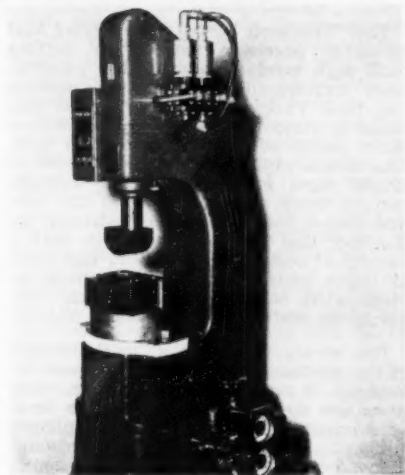
NEW TABER PRESS HAS HYDRAULICALLY CONTROLLED RAM MOVEMENT

The Taber Instrument Corporation has recently introduced a press powered by compressed air with hydraulically controlled ram movement, with precise electronic timing features providing an adjustable preset rate of movement in closing the die or performing an operation.

This new Model 129 press is adaptable for drawing, forming and assembly operations where a variety of conditions is encountered. For instance, an assembly operation may require a fast traverse of the tool attached to the ram to a point 1/16" above an operation, then a slow powerful stroke up to 2 tons pressure will be required to perform the operation.

The pressure of the ram is adjustable from 100 lbs. to 2 tons. The rate of ram travel is adjustable from 1000" per minute down to 10" or less per minute. The electronic control panel provides for one or more stop periods of varying duration for positions to meet the requirements of the work being performed.

These presses are furnished in several models and capacities suitable for slow or very rapid operation, and provided with one or more adjustable ram positioning stops, depending upon their serv-



ice requirements. Complete data will be furnished upon request. Write:

Taber Instrument Corporation, Dept. BB
111-MTB Goundry Street
North Tonawanda, N. Y.

SAVE TIME
on intricate, angular
SET-UPS

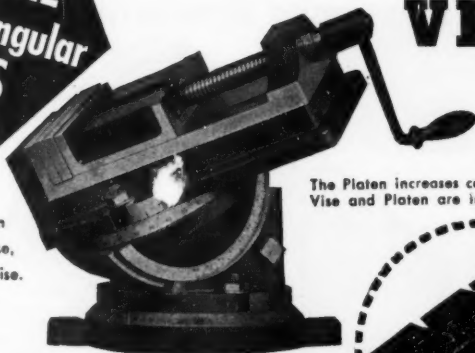
Multi-Swivel **WISE**

Fully universal . . .

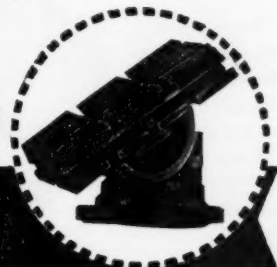
three swivels simplify the setting of compound angles.

Parts interchangeable . . . can be used as a plain flanged vise, a swivel vise or multi-swivel vise.

Write for name of nearest distributor



The Platen increases capacity of the unit. Vise and Platen are interchangeable.



MASTER TOOL CO.

67 BATTERYMARCH ST. • BOSTON, MASS.

HIGH SPEED PRECISION SORTER ACCURATE WITHIN .0003"

The "Precision Sorter," a machine that combines precision gauging or sorting with high production rates, has recently been introduced by U. S. Engineering Co., New York manufacturers. This machine is stated to have accuracy within three tenths of a thousandth of an inch. The speeds obtained vary from 100,000 to 200,000 parts per hour for the average run of work, depending upon the size and shape. Its versatility is indicated by the fact that it can be used to sort a variety of objects accurately to size, such as beads, capsules and tablets, metal or plastic discs, screw machine products, rubber plugs and many other small objects.

The accuracy is built in to the design of the machine. Once set for a given dimension, it cannot lose its accuracy, since there are no delicate parts to lose their adjustment. The machine is completely automatic. The parts to be sorted and dumped into the hopper, and the segregated parts stream out of their respective chutes into separate containers. Once the unit is set up, no attention is required except to fill the hopper and to remove the sorted containers when full.



The gauging members of the Precision Sorter are simple and sturdy. The adjustment and change-over from one size to another is made by means of a few

Measure "INSIDE" Diameters

WITH RIMAT INSIDE MICROMETERS

*Measure Bores,
Counterbores,
"O" Ring Grooves*

*The slender
tips and long
handle reach
locations in-
accessible to
conventional
measuring
equipment.*



Measuring tips are controlled, expanded and retracted from handle. Calibrations always outside of work in clear view. Standard sizes $\frac{1}{2}$ " to 12". Special sizes made to order. Write for prices and circular.

RIMAT

MACHINE TOOL CO.

1123 Air Way, Glendale 1, Cal.

screw adjustments, and is done in a few minutes. A speed control mechanism can accelerate the machine to increase production, or retard it to increase accuracy. Dust, chips and other foreign matter are eliminated by passing between the rollers under or near the hopper into a container for undersize parts. The machine has no agitation in its operation, thus breakage or damage to parts is eliminated. The machine comes equipped with a ¼ h.p. motor which drives through an adjustable speed control up to a gear reducer from which the rollers are driven by means of a chain drive and suitable take-up.

Overall dimensions: width 20"; length 58"; height 61"; hopper capacity is approximately two cubic feet. For complete construction specifications, write the manufacturer, attention of Mr. B. R. Garrett:

U. S. Engineering Co., Dept. BB
140 Nassau St.
New York 7, N. Y.

ELGIN DIAMOND ABRASIVE COMPOUND

Elgin Diamond Compound, a new diamond abrasive manufactured by the Industrial Products Division of the Elgin National Watch Company, was first in-

troduced at the recent Chicago Production Show. The newly developed synthetic vehicle used in the preparation of Elgin Diamond Compound is said to expand greatly the field of economical application for diamond abrasives.

Special advantages of the compound are due to the exclusive synthetic vehicle which carries the diamond abrasive, and the precise size grading of the actual diamond particles. Only pure virgin diamond is used. Accurate grading eliminates under size or over size particles and assures rapid, uniform cutting action. According to its manufacturers, the new Elgin Diamond Compound permits the use of standard time-analysis procedures in connection with lapping and polishing operations.

The new synthetic vehicle resists caking or drying out, is soluble in commercial solvents and water and leaves no dulling film on finished surfaces. It has a wide range of temperature stability, from 150° F. to -50° F., that permits machine lapping with diamond abrasives for the first time. These characteristics of the new Elgin Diamond Compound are said to provide a more economical finishing method for many industrial appli-



Series "E" Model 1400-E Pivot Mount

These cylinders are made to your order with any length stroke you request in any of these bore sizes:

1½, 2, 2½, 3, 4, 5, 6, 8, 10

In ordering please write mounting, bore, stroke and piston rod thread you want.



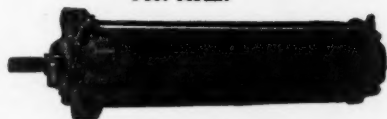
Series "E"
Model 1300
Rear Flange
Mount

Cylinders—any bore, any stroke, any mounting, air, water, hydraulic

1 WEEK DELIVERY ON THESE STANDARD CYLINDERS



Series "E" Model 1500
Foot Mount



Series "E" Model 1200
Front Flange Mount

PNEUMATICS INCORPORATED

OF PLYMOUTH, INDIANA
Head Cylinder Manufacturing Department
2723 Connors Street, Port Huron, Michigan
Telephone 7181

cations. Typical uses are finishing carbide and hardened steel parts, plastic molds, drawing dies, bearing surfaces, lapping of hardened gauges and polishing the edges of cutting tools for increased tool life.

For further information, address inquiries to:

Industrial Products Div., Dept. BB
Elgin National Watch Co.
Aurora, Ill.

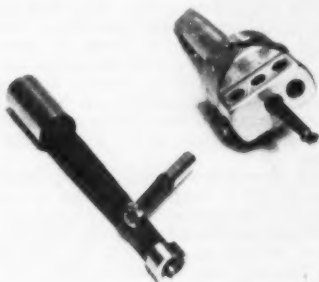
BORING BAR FEATURES GREATER DIAMETRICAL CLEARANCE

A new boring bar which affords freer cutting made possible by greater diametrical clearance without sacrificing body diameter has been developed by A. B. Craley & Son. The new tool is designed with twice the amount of usable head, with the same diametrical clearance. It can be used as a double-end cutter where holes are to be reamed to size.

Boring can be accomplished with each lip individually until dull, then both can be sharpened by using a toolmaker's cube on a surface grinder. The bar's eccentricity and clearance in front are ground

after hardening to assure proper clearance for the full life of the tools. The tools are to be ground on the top of the cutting edge only.

The standard sizes of the Craley boring bar are from $\frac{1}{8}$ " to 1", in solid high speed



steel. Two-piece bars can be supplied in $\frac{1}{2}$ " or larger diameters. For complete specifications on this new tool, write the manufacturers:

A. B. Craley & Son, Dept. BB
62 Knight Ave.
Clementon, N. J.

LOWN SLIP ROLL FORMING MACHINES

B-600 SERIES

A new, improved, modern design, heavy duty machine, engineered for durability, strength and service.

SELECT THE BEST . . .
 LOWN Slip Roll Forming
 Machines are versatile . . .
 dependable . . . easy to
 operate.

Write for bulletins!

LOWN Slip Roll Forming
 Machines are built in a
 range of sizes from which
 you can choose the exact
 unit for your requirements.



Model B-600 Series—6" diameter

SAN ANGELO FOUNDRY & MACHINE COMPANY

SAN ANGELO, TEXAS

1000 EAST UPTON

Distributors in Most Principal Cities

INTERCHANGEABLE NEON DISPLAY SIGNS

An ingenious new neon sign, featuring interchangeable letters and characters, has recently been introduced by the Neco Manufacturing Co., Inc. The neon words comprising the sign may be altered to suit the user's purposes, simply by replacing or rearranging the individual neon letters. A complete two-line neon display can be made in just a few seconds. A wide selection of letters, figures, novelties and prices enables the user to change his display at any time.

This new product should meet with wide usage in industrial plants, since it can be used for signs announcing plant schedules, schedule changes, special information, directions, special safety regulations, and similar announcements. The sign may be placed



above regular bulletin boards to attract additional attention. For complete details regarding this revolutionary new neon sign, write:

Neco Mfg. Co., Inc. Dept. BB
Auburn, Indiana

O.B.I. PRESS

HORN PRESS

DEEP THROAT

**EFFICIENT — LOW COST
PRODUCTION**

MEANS

ROUSSELL

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PRESSES**

**WRITE FOR
DETAILS**

SERVICE MACHINE COMPANY

**7627-33
S. Ashland Ave.
Chicago 20**

COSA OFFERS REISHAUER GRINDING MACHINE

The famous Swiss firm of Reishauer Tool Works, Ltd., Zurich, is represented exclusively in the United States by Cosa Corporation, New York. A comparatively recent development of Reishauer is their model ZA Gear Grinding Machine. This precision unit was displayed at the A.S.T.E. show in Cleveland in the fall of 1948, where it created widespread interest, since the machine operates on the generating principle. This method has been largely employed for milling gears, but, until recently, was not usually considered for grinding. The new Model ZA is capable of grinding high precision gears at very fast production rates.

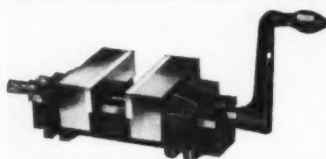
For the grinding tool, a single thread grinding worm with a rack profile is employed; this is not limited to a restricted number of cutting faces, but generates the theoretical shape of the gear tooth by means of an infinite number of enveloping cuts.

The Reishauer machine is suitable for grinding spur gears and helical gears up to a diameter of $9\frac{1}{2}$ ", and a pitch up



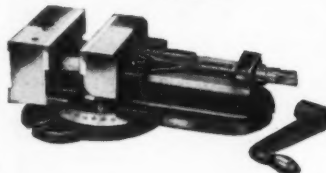
to DP 6. Because of the high production capacity of the new method, gears with pitches below DP 32 can also be economically ground from the solid blank.

The grinding process is continuous and is not interrupted by any dividing op-



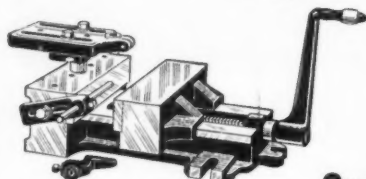
NEW GRAHAM CENTERING VISE

With left and right hand screw, both jaws move toward center, centering work regardless of size variations. This gives double-fast action. Can be used with interchangeable V jaws. Handle fits either end.



MULTI-PURPOSE SWIVEL BASE VISE

Has exclusive ADJUSTABLE ZERO POINTER to assure coincidence with zero on base. Complete 360° rotation. Positive 2-point lock in any position. Screw never protrudes under work, cannot be drilled into. Usable with special jaws and jig attachments described below. Removable from base for use plain.



JIG ATTACHMENT VISE

Usable plain. Also drilled and tapped for stops, guides, bushing plates and other attachments making it a Multi-purpose jig or fixture serving many repeat-operation needs saving the cost of making special devices.

ALSO "ADJUSTANGLE"-KNURL TOOL FITTING TURRET

Request Illustrated Price Bulletin 44

Graham Mfg. Co. 59 Bridge St.
East Greenwich, R. I.

erations. The machine works automatically, adhering to the finished dimensions within very close tolerances; therefore, time spent in measuring is to a great extent eliminated. The life of the grinding worm is extremely favorable. The time required for re-profiling is about 12% of the effective grinding time.

The horizontally arranged grinding slide performs the wheel feed movements and carries the attachment for profiling the grinding worm. The vertically adjustable work slide guides the rotating work-piece, held between two centers, past the grinding worm. To set straight toothed gears into the helix angle of the grinding worm and to grind helical gears, the vertical side can be swiveled in both directions up to an angle of 45° maximum.

During the working operation, the work slide travels upwards by means of oil pressure. The speed of travel can be regulated between wide limits by means of a variable delivery pump. The pump drive is arranged so that the predetermined feed travel always represents the distance travelled by the slide per rotation of the work-piece, regardless of the number of teeth of the workpiece.

For complete description of the Reishauer Model ZA Gear Grinding Machine, write for the large, attractive 16-page illustrated catalog to:

Cosa Corporation, Dept. BB
405 Lexington Ave.
New York 17, N. Y.

IDEAL "COIL-FLEX" FISH TAPE

Ideal Industries, Inc., announce a new Fish Tape designated as the "Coil-Flex". It can be used in all types of conduit, including aluminum. It is ex-



tremely flexible and can be pushed or pulled with little effort through any and all bends allowed by the electrical code.

Why You Save Money 2 WAYS with This SWISS Jig Borer!

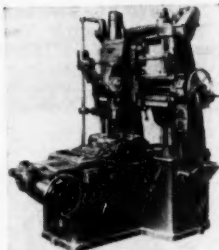
CHECK THESE FACTS:

1. You Step-up Production, Reduce Costs and get a Higher Quality Product with Finer Finish because this borer is a high-precision Swiss machine. Its automatic features are capable of fine adjustment with highest possible accuracy. Result: increased production, a perfect finish to the closest limits, and longer life for the tools. But this is only one of the ways you save money!

2. You save money in first cost on this Swiss jig borer because you buy direct from this manufacturer. Not only is this important Swiss tool priced no higher than corresponding domestic tools, size for size and capacity for capacity, but, because this manufacturer maintains its own sales offices in the United States, many extra charges are eliminated, making it possible for you to obtain this precision Swiss jig borer at astonishingly reasonable cost.

Model 4C illustrated, with 18 spindle speeds from 45 to 2,000 R.P.M., provides the correct range for all jobs up to the maximum drilling capacity of 1½". Six automatic feeds of the boring spindle from 0.0005" to 0.0080" per revolution operate when rising and descending.

Positive Accuracy — Stabilized measuring screws of special heat treated steel, equipped with corrector bars to compensate for small pitch errors, assure positive accuracy of setting to 0.0002".



HAUSER MACHINE TOOL CORP.

MANHASSET, N. Y.

Representing Henri Hauser, Ltd.,
Bienne, Switzerland

Get illustrated bulletin giving complete details and specifications for this Hauser Jig Borer.

MAIL THIS COUPON TODAY!

Hauser Machine Tool Corp., Dept. BB
Manhasset, N. Y.
Kindly send illustrated bulletin giving complete details of Hauser Jig Borer 4C.

Name
Address
City Zone State

The tape's round surface is easy on the hands and permits a safe grip. It slides through any type of conduit more easily than flat tape. The ends are smooth and round to avoid catching or snagging, thus it positively prevents cutting or damaging of aluminum conduit.

The Ideal "Coil-Flex" consists of a 25-foot length of steel spring, 11/32" in diameter, with a rustproof inner steel cable. A threaded male fitting on one end and a female fitting on the other makes it easy to join together two or more lengths for jobs requiring longer tapes. The "Coil-Flex" can be rolled into a 10-inch diameter circles. When dropped on the floor, it simply spreads out. It never kinks, snarls, nor springs loose. Each "Coil-Flex" Tape is factory inspected and tested at 400 pounds pull. For complete information, write:

Ideal Industries, Inc., Dept. BB
1441 Park Ave.
Sycamore, Ill.

NEW NO. 24A ELECTRIC DRILL

Stanley Electric Tools announce their new No. 24A 1/4" Electric Drill. A compact, sturdy drill, it is designed for production work wherever a light-weight, small-size 1/4" Drill is required.

The tool is built with a surplus power for drilling in metal, wood and composition materials. Drill can be used at full load for continuous drilling without stalling. The unit's speed is 1800 r.p.m. no load; 1100 r.p.m. at full load.



The construction features incorporate a strong aluminum alloy die cast housing, helical gears, oil impregnated bronze bearings, three jaw Jacobs Chuck, trigger-type switch with locking device, rubber covered cord of three wire type, with ground connection.

Write for complete information to:
Stanley Electric Tools, Dept. BB
Division of The Stanley Works
New Britain, Conn.

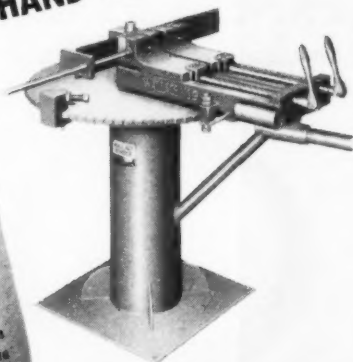
OVER 50 YEARS ★ THE BENDER PEOPLE

Wallace

Here is an easily operated hand bender for economical bending of flats, rounds, pipes and bars. 4" high dies and 2" diameter pin for radius bending included as standard equipment. All steel construction, sealed ball bearings, die holders keyed for speedy change-over are other features of the Wallace No. 9 Hand Bender... a basic unit for production and for maintenance. Write, phone or wire today for detailed bulletin.

"Cold Bending Manual" and data on HYDRAULIC POWER benders available on application.

NO 9 HAND BENDER

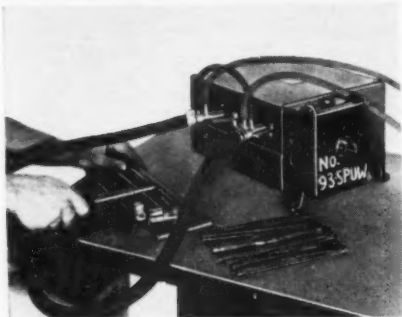


WALLACE SUPPLIES MFG.

1310 DIV. PKWY. CO. CHICAGO 14. ILL.

EISLER IMPROVED SPUTTER WELDER

The illustration below shows an improved type of electric Sputter Welder designed and marketed by the Eisler Engineering Co. Inc., to facilitate mass production in industries manufacturing light metal commodities, especially thin hollow articles, made from nickel silver, low carbon and stainless steel, brass, etc.,



such as knife, fork, comb and mirror handles, and similar items needing soldering work for their finish.

This simple welding machine is used as a preparatory tool for a following soldering operation. It eliminates completely the cumbersome hand manipulation of binding and holding the thin counterparts together by means of wires or clamps, in order to form the hollow body to be filled with soldering material—thus saving valuable time and lowering costs drastically.

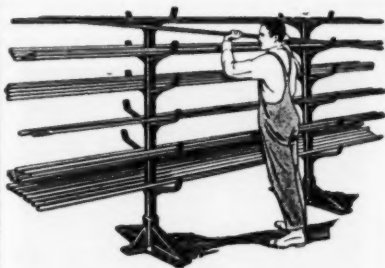
The unit consists essentially of a transformer for reducing shop current to current suitable for electric arc welding. There are five secondary taps on the transformer, each subsequent tap representing a higher secondary voltage. The use of these taps is determined by the thickness and type of material to be joined.

The parts to be welded are firmly united by gently brushing the work in a kind of a (spark sputtering) tacking operation. A rheostat is supplied where fine heat adjustment in between the secondary taps is required. This Eisler Sputter Welder is built in a capacity from $\frac{1}{2}$ to 3 KVA and mounted in an electrically grounded steel case. For complete specifications, write:

Eisler Engineering Co., Inc.
750 S. 13th St., Dept. BB
Newark 3, N. J.

-WANT QUICK SERVICE IN YOUR STOCK ROOM?

The BROWN SECTIONAL STOCK RACK eliminates loss of time in your STOCK ROOM to such an extent that it pays you back its first cost in a surprisingly short time. The time previously lost in end-hauling each bar of stock its entire length is saved by the BROWN SECTIONAL RACK which requires but a few inches of side movement.



Each length, width and thickness of stock is displayed in Gold-Fish visibility for instant selection and workmen waiting for stock are served without waste of time. The BROWN SECTIONAL RACK is a simple, durable article built in five styles from standard inter-locking metal sections. It cannot burn, sag or twist; unattached to the building, it can be moved at will. Changes in length of stock can be met by moving the units nearer or further apart, while increases of stock can be met by simply adding more standard units. Built from metal thruout, depreciation is practically nil. SEND FOR BULLETIN 26-M.

BROWN SECTIONAL RACK

BROWN ENGINEERING CO.

126 N. THIRD ST. READING, PA.

RACKS • VISES • CLUTCHES • COUPLINGS

12" PRECISION LEVEL FOR MACHINE TOOLS

A new, sensitive 12-inch precision level designed especially for levelling machine tools is now being manufactured by the South Bend Lathe Works. The level has a ground and graduated vial mounted in a 12-inch cast iron frame with the base precision ground on all useful surfaces including the v-way for leveling shafts. The spirit vial has been selected to provide the correct sensitivity for quick, accurate leveling. It is substantially mounted in the frame and protected from accidental breakage by an aluminum alloy cylinder which may be revolved to completely enclose the vial.

The importance of properly leveling a lathe or other machine tool when it is installed, and periodically checking the leveling, is recognized by engineers and production men. Often a machine is mistakenly thought to be inaccurate when



the entire difficulty is due to incorrect leveling. Precision tolerances can be maintained on a lathe or other machine tool only when it is properly installed and leveled.

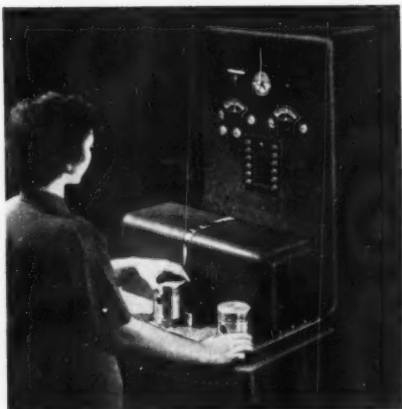
A catalog with specifications of this device is available upon request.

South Bend Lathe Works
384 E. Madison St.
South Bend 22, Ind.

MULTIPLE STATION PISTON GAGE

Nine critical dimensions of an automotive piston are checked simultaneously on this specially designed Multiple Station Piston Gage made by Pratt & Whitney, Division of Niles-Bement-Pond Company. By means of three Pratt & Whitney gaging mediums (Air-O-Limit, Electrolimit, and Multiple Contact) combined into this one fixture, the gaging operations are performed simultaneously.

To operate this gage, the inspector simply places a piston on the automatic loading mechanism and watches the lights and meters on the instrument panel. The piston is drawn automatically into gaging position and the nine dimensions are gaged simultaneously. Green lights in-



dicate undersize, and red lights indicate oversize dimensions. The three meters show the variation in pinhole diameter, skirt taper and skirt diameter, respectively. The other dimensions which are checked include the three ring groove diameters, the top land diameter, the dome height and the skirt squareness. For complete details concerning this interesting Multiple Station Piston Gage, write:

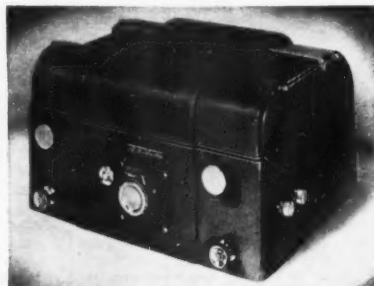
Pratt & Whitney, Dept. BB
Div. Niles-Bement-Pond Co.
West Hartford 1, Conn.

BUEHLER DUO-BELT WET SURFACER

The AB Duo-Belt Wet Surfer provides a quick means of cool, safe hand grinding for standard tools or small production parts. It is powered to drive two belts simultaneously at either 1600 or 3200 feet per minute. Belts are cloth backed silicon carbide with grits from 80 to 600. They are fabricated particularly for wet grinding with water or water soluble oils. Coolant is furnished each belt independently and uniformly, by a valve controlled spray head. The source of the coolant can be by direct connection to standard water lines or by use of the AB Recirculating Cooling System which

is provided with a series of slow motion, spill-over type settling tanks which remove abraded residues. A pump delivers clean, cool liquid to either or both belts.

The AB Duo-Belt Wet Surfer can be used for the grinding of metals in the same fashion as standard belt sanders



are used, but with the belt and work being water cooled, certain advantages accrue. There is no waste of time dipping tools or production parts in coolant to prevent tempering. The device provides

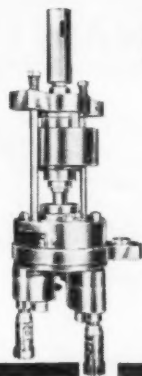
uniformly flat removal of metal, due to lack of formation of "flow" metal from local hot spots. True cutting action, without burnishing, is a further feature. The loading tendency of the belt is minimized by the liquid wash, and the production pieces remain cool. A flat surface on work pieces is produced without dressing. For complete specifications, write:

Buehler Ltd., Dept. BB
165 W. Wacker Drive
Chicago 1, Ill.

NEW DEVICE FOR MICROMETER CONTROL OF CUTTING DEPTH

The new Micrometer Stop Unit introduced by Aero Tool Co. operates on the principle of a micrometer using a 40-pitch ground thread. It locks positively in any adjustment, and can be instantly adjusted in increments of .001", without removing it from the machine or drill press. The Stop is used in conjunction with taper shank countersink cutters and counterbore cutters, available in a variety of angles, diameters and pilot sizes.

The device's use assures flushness in screws, rivets and other flush fastenings. The taper shank assures concentricity



Only ERRINGTON Adjustable

TAPPING HEAD

Offers So Many Advantages

Sizes $\pm 0 - \pm 10$ Tap to $5/16"$
 $\pm 1 - 3/16"$ Tap to $1/2"$
No. Spindles: 2 to 6

Here's a versatile tool which permits you to take advantage of a wide range of adjustment — without overhang. Supplied with 3 spindles for equal adjustment in line and 3, 4, 5 or 6 spindles for equal adjustment on bolt circles.

Write for Complete Information

- Fully geared
- Needle bearings on all spindles in head
- Ball thrust bearings throughout
- Bronze bushed

ERRINGTON

MECHANICAL LABORATORY, INC.

Established 1891

Main Office & Plant:

Staten Island 4, New York
Chicago Office California Office
6701 N. Sioux Ave. P.O. Box 543
Chicago, Ill. Alhambra, Calif.

- Sand cast aluminum case
- All parts fully enclosed for pressure lubrication and protection
- Non-slip positive clamping on all adjusting members

of the cutter with the spindle. The Micrometer Stop Unit has a $\frac{1}{4}$ " shank, permitting its use in stationary or portable tools.

Countersunk cutters are available in $\frac{7}{16}$ " and $\frac{3}{8}$ " diameters, with integral pilots from $\frac{3}{32}$ " to $\frac{1}{4}$ ", in increments of $\frac{1}{32}$ "; also available from interchangeable $\frac{3}{32}$ " and $\frac{3}{16}$ " shank pilots. Pilot sizes are from $\frac{3}{32}$ " to $\frac{5}{16}$ ".

Aero Tool Co., Dept. BB
6930 Avalon Blvd.
Los Angeles 3, Calif.

OVER-THE-WHEEL GRINDING FIXTURE

An unusual and ingenious new grinding fixture has recently been introduced to the metalworking field by Peerless Tool & Die Co. The new device, called the Peerless "Over-the-Wheel Grinding Fixture, has been developed for the specific purpose of grinding the ends of pieces which are too long to grind under the wheel on surface grinders. The tool is made for use on Brown & Sharpe, Hammond, Reid, and several other standard makes of surface grinders.

The new grinding fixture has been found to be particularly effective for

grinding the ends of long die sections, fixture parts, gages, precision shafts, and similar parts. The tool is made from close grained, normalized grey iron casting. It has been carefully engineered to prevent tipping when the magnetic power is



released. It stands approximately 15" high; the working surface is square within .001". Further data on the Peerless Grinding Fixture will be supplied upon request to the manufacturer. Write:

Peerless Tool & Die Co.
614 W. Calvert St., Dept. BB
South Bend 14, Ind.

CARBOLOY TIPPED SCRAPER BLADES

Especially good for hard alloy iron and extremely hard bronze castings. If you are using Anderson Hand Scrapers it is not necessary to buy complete new scrapers in order to use carboloy tipped blades. Simply remove high-speed blade and slip in the Anderson Carboloy Tipped Blade. Available in three widths.



by *Anderson*

THEY LAST 8 TO 10
TIMES LONGER



Send for Bulletin 6-5

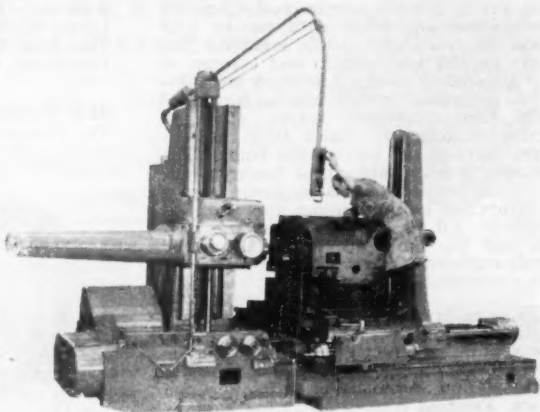
ANDERSON BROS. MFG. CO., Rockford, Ill.

Hand and Power Hydraulic Presses, Balancing Ways, Roto Checkers, Hand and Power Scrapers, Spotters.

LUCAS PRECISION BORING MILLS

The Lucas precision horizontal boring, drilling and milling machine boring the large casting shown at the right is one model of a complete line being built in Cleveland by the Lucas Machine Division of The New Britain Machine Company. The line is built in 3, 4, 5 and 6-inch spindle sizes with both electrically and mechanically controlled models. These new machines feature greater operating efficiency and increased versatility. They are equipped with automatic power positioning for both table and head, which feature allows the operator, using dial indicators, to repeat accurately on spacing operations, either horizontally or vertically, thus eliminating jigs or fixtures.

With the advent of automatic power positioning, the boring mill is now quali-

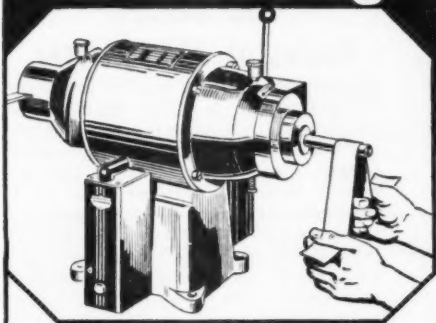


fied for all types of production work in addition to being already established as a necessary Tool Room and maintenance machine.

Cut Polishing Time up to 80%

with

SCHAUER SPEED LATHES



Write for CATALOG 480 showing types
for all secondary finishing operations.

Users report production increases of 50% to 100% over former methods when Schauer Speed Lathes are used to polish, lap, de-burr or finish metal or plastic parts. These high-production machines do the job speedier, better, and at lower cost.

THE SCHAUER MACHINE CO. — Originators of Today's Speed Lathes

2084 READING ROAD

CINCINNATI 2, OHIO

The construction of this new line of Lucas boring mills incorporates a one piece bed well ribbed, deep box construction which extends continuously beneath the column and table with two or four ways for table and saddle support. The ways on the bed, saddle and column of the illustrated model are hard steel inserts, (all other models can be furnished with flame hardened ways), all hand fitted, fastened to make them an integral part of the bed or the frame. The column, saddle, table, and backrest are all designed and built to insure long, accurate life and maximum operating efficiency. All feeds of the head, the saddle and the table are accomplished by hard surfaced screws and all oiling on these machines is automatic.

These mills have one spindle with both high and low speeds. On high speed work, the spindle is directly driven by V-belts and vibrations are dampened by the fly wheel action of the by-passed low speed gears. Pendant control on 3" and 4" spindle machines start, stop, jog and reverse the spindle rotation.

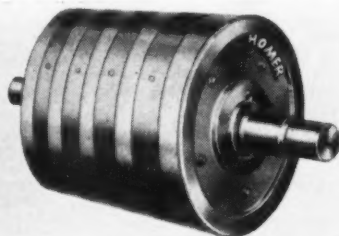
Work ranges of 36" x 36" to 94" x 84" are covered by the Lucas line. Speed range from 7½ to 850 r.p.m. on 5" and 6"

machines, to 13½ to 1500 r.p.m. on the 3" spindle machine, with special speeds available on request.

Address all inquiries to:
Lucas Machine Division, Dept. BB
The New Britain Machine Co.
Cleveland, Ohio

NEW PERMANENT MAGNETIC PULLEY

The Homer Manufacturing Co., Inc. announces the latest addition to its line of permanent magnetic separating equip-



ment—the Power Plus “non-electric” permanent magnetic pulley. The entire line of Power-Plus units is guaranteed to equal or exceed the strength and per-

HERE IS A REAL TIME-SAVER!

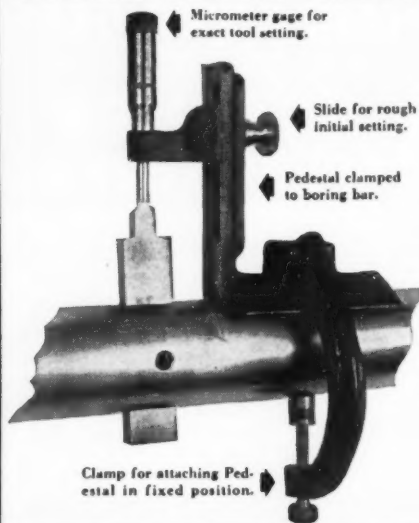
... AND WORK-SAVER, TOO!

The Bartelt Pedestal Micrometer

Enables you to set boring tools accurately from the bar diameter—eliminates common cut-and-try methods. Permits quick micrometer height measurements from flat or round surfaces. Can be used as a production-inspection tool with a wide range of settings. Ideal for jobbing shop and toolroom mechanics. Quality construction, moderately priced—sold direct-to-you by the manufacturer. All components precision machined of high grade materials and carefully assembled. Made in eight models for various applications. Write today for literature and direct-to-you prices.

BARTELT ENGINEERING CO.

1218 Partridge Ave. Beloit, Wisconsin



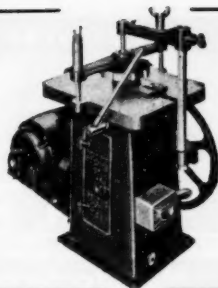
NO BUSHINGS, GUIDES or PILOTS NEEDED!

THE READING BROACH KEYSEATER

The Reading Bench Machine requires no bushings, guides or pilots. No other machine like it. Very fast—capacity from $\frac{1}{8}$ to $\frac{3}{8}$ cutter.

Low first cost—prompt delivery.

READING MACHINE COMPANY, Reading (Cincinnati), Ohio



formance of an electro magnetic pulley of the same size and capacity. The new Homer pulleys are designed to be used as either head end pulleys, or as idler pulleys in belt conveyor systems. They are furnished in 57 standard sizes, in diameters of 12", 15", 18", 20", 24" and 30", with belt widths ranging from 4" to 60".

The Power-Plus pulley was designed especially for the separation of tramp metals from products of such industries as coal, textile, foundries, steel mills, chemicals, and others requiring thorough tramp metal extraction during or before processing.

The new pulleys are crowned to prevent belt weaving and run-out, and to assist in equalizing the conveyed material as it passes over the pulley. Standard or special length shafts are available to fit new or existing applications without changing bearings or shaft mountings. Head plates are cast aluminum, which eliminates the piling up of magnetic material on the outer edges of the pulley. The pulleys are designed to prevent any loss of magnetic flux to the shaft to attract injurious metal particles to the bearing areas.

The new units require no outside power

source, and are not affected by atmospheric or temperature changes; they can be applied to either indoor or outdoor applications without interference to their performance.

For additional data, write:
The Homer Manufacturing Co.
Dept. 140
Lima, Ohio

CONTROL UNIT FOR HYDRAULIC PRESSES

A newly developed model No. 140-X Robotron control unit designed to perform automatic bumping (breathing) operations on hydraulic presses is announced by Emmett Machine & Manufacturing, Inc. This new control unit can be set to give from one to forty bumps during any one cycle of operation, as well as to control the over-all cure time.

The Robotron Model No. 140-X is equipped with three built-in time arrangements. It is wired for use with limit switches to regulate the amount of press opening during the bumping operations, to close the press after a predetermined time, and to hold the press closed until the next bump.

The device provides a range of 21 different cure times for each setting of

USE ECONOMY — DERIVE ECONOMY



SOCKET HEAD
CAP SCREWS

MILLED
FROM BAR



HOLLOW
SET SCREWS



MADE OF
ALLOY STEEL

ECONOMY MACHINE PROD. CO., 5207 Lawrence Ave., Chicago 30, Ill.

For over 30 years the leader in the field

**ASSEMBLE
FRAGILE
MATERIALS
SAFELY**

TOWNSEND RIVETERS join rugged steel or fragile mica safely and at low cost. There is a Townsend Machine ideally suited to your particular assembly requirements. WRITE FOR FULL INFORMATION.

THE H. P. TOWNSEND MFG. CO.

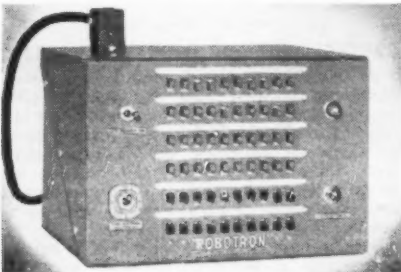
99 BROOK STREET, ELMWOOD, CONN.

Manufacturers of Riveting and Screw Machines



the time range switch. Bumps can be timed to be either alternating or consecutive, as required, for any particular application.

Model No. 140-X is recommended for processes where changes of cycles or molds are common and where complex bumping combinations are necessary.



Push buttons provide instant control of press operations. Once predetermined cure time and bumping arrangements are set, the press will continue through the cycle without additional attention. The unit is particularly suitable for use where

remote control of any hydraulically operated press is desirable.

The new Merit Robotron control unit operates as a positive electrical switching device and does not employ gears, cams or adjustments of any kind. Shock mounting is provided for extra protection. For complete specifications on the Robotron control unit, write:

Emmett Machine & Mfg., Inc.
2249-7 Fourteenth St., S.W.
Akron 14, Ohio

ATLANTIC GEAR WORKS APPOINTED DISTRIBUTOR

The Atlantic Gear Works, Inc., 200 Lafayette Street, New York 12, N. Y., announce their appointment as an exclusive distributor of Ohio Stock Gears manufactured by the Ohio Gear Company of Cleveland, Ohio. Their territory consists of the States of New York, Connecticut and New Jersey, south to and including the city of Trenton. A complete and diversified stock is carried by the distributor at 200 Lafayette Street, New York City. The addition of the Ohio Stock Gear line augments the Atlantic Gear Works' present distribution of mechanical power transmission equipment.

"STAR DUST"

**LABORATORY GRADED
PURE DIAMOND POWDERS**

For GAUGES, TOOLS, DIES, etc., with tremendous TIME SAVING. These factors make STAR DUST indispensable in lapping and superfinishing on HARDSTEELS, TUNGSTEN CARBIDE, CHROME.

- Absolute control of particle sizes
- STAR DUST sizes as fine as .0001"
- Complete absence of out-size particles
- Complete range of grit sizes

There is a STAR DUST Field Serviceman in your territory.

ACE ABRASIVE LABORATORIES

**139 DUANE STREET
NEW YORK 13, N. Y.**

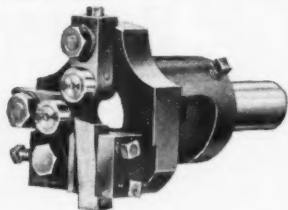
STAR DUST speeds up production enormously and produces finishes and superfinishes down to less than .0000004 of an inch.

**Precision LAPPING
POWDERS for
PRECISION work**



WATSON

Tangent Cut Box Tool

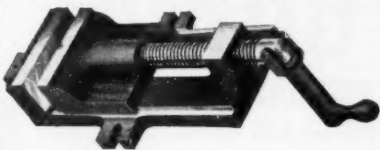


A general purpose, tangent cut, roller rest box tool of wide range for turning diameters from bar stock castings, forgings or other material. Applicable to all sorts of screw, turret and other machines, hand or automatic. It is simple to set and eliminates resetting when it is necessary to grind the bit. Write for descriptive folder giving complete information.

The Watson Mfg. Co.

2220 ALBION ST. TOLEDO 6, OHIO

YOST DRILL PRESS VISE



This new Yost vise has been designed expressly for use on drill press operations. Does away with special and costly jig fixtures.

Offered in two sizes.

Vise No.	Width of Jaw, inches	Opens Inches	Weight Pounds
1D	3 1/2	3 1/2	12 1/2
2D	5	5 1/2	23

Do you need a vise of ANY type?

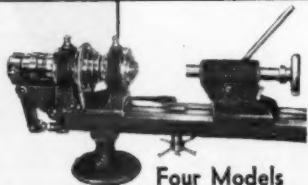
Write today for bulletins on the extensive Yost line

YOST MFG. COMPANY

1335 SO. MAIN STREET
MEADVILLE, PENNSYLVANIA

LATHES
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ATTACHMENTS
COLLETS

DERBYSHIRE
Fine Precision Instrument LATHES



Four Models
Collet Capacity
.196" to .315"

F. W. DERBYSHIRE, INC.
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NIELSEN
Heavy Duty
Live Centers

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live centers

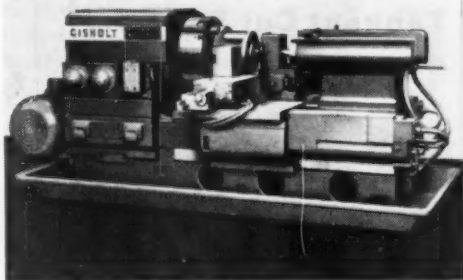
Adapted
for heavy
duty work.
Precision type
ball and roller
bearings assure
maximum capac-
ity for high speed
production and long
service.

NIELSEN, INC. LAWTON, MICH.

NEW GISHOLT HYDRAULIC AUTOMATIC LATHE

The Gisholt Machine Company announces its new No. 24 Hydraulic Automatic Lathe. The pilot model for this machine has been engaged in actual production in the shop of a prominent tractor manufacturer for nearly two years.

The new unit is constructed to perform heavy-duty operations. Standard equipment consists of front and rear carriages, 23" wide, 28" long, 3" high, with a travel of 24"; each has its own auxiliary slide. Each slide is equipped with its own feed pump and controls; it can be mounted to traverse and feed at any angle to the spindle centerline. Four ranges of spindle speeds are provided, with 32 possible combinations within each range; these include speeds of from 25 to 136 r.p.m. in the first range, to 69 to 378 r.p.m. in the fourth range. The speeds are selected by pickoff gears; the starting and stopping of the spindle is part of the automatic cycle. The set-up is simplified by hydraulic controls which permit the operator to make the slides run separ-



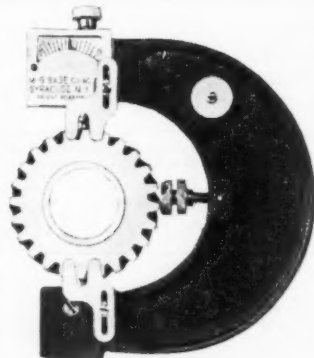
ately, stop at any point, and back up or continue the cycle.

The swing over the bedways of the unit is 35½"; over the front carriage is 28", and the length between centers amounts to 36". Standard chuck sizes are provided, ranging from 15" to 32". The feeds are infinitely variable, with a maximum of .125".

The new Gisholt lathe is especially use-

INDICATOR GEAR GAGE ACCURATE • DEPENDABLE

In 5 to 10 seconds your operators can easily and accurately check pitch diameter without disturbing the set up! The element of human error is entirely eliminated with the new Indicator Gear Gage. Simple to operate, each gradation on the gage represents .001 movement of the contact point. Equipped with American Gage Design Standard Adjusting and locking device. Available in sizes to handle 1½" to 11½" O.D. gears. Low in cost. **Precision Built** for long use. For quotation, indicate gear O.D. pitch diameter, ball size and face width. Write or wire today.



M. G. GAGE CO.
107 N. FRANKLIN ST.
SYRACUSE 4, N. Y.

Also manufacturers of Syracuse-Style Square Pin
and AGD style Adjustable Limit Snap Gages.

ful in machining such parts as diesel cylinder liners and pistons, ball and roller bearing races, aviation and gas turbine parts, pipe flanges, large valve bodies, etc. For complete specifications and operational data, write:

Gisholt Machine Co., Dept. BB
Madison 10, Wis.

HAMMOND SEMI-AUTOMATIC POLISHING AND BUFFING MACHINES

Four new two-spindle manual indexed Semi-Automatic Polishing and Buffing Machines have recently been announced by Hammond of Kalamazoo.

These new machines, used in conjunction with any lathe or contour machine will pay for themselves in three to six months through increased production and better finishes, according to their manufacturers.



Simplicity of new "unit" design, and other features, make them versatile in operation on such parts as hub caps, pots, pans, lamp bodies, towel rods, plumbing fixtures, etc.

Polishing or buffing with wheels or abrasive belts and backstands can be efficiently accomplished with these Hammond Semi-Automatics by inexperienced operators. Other Semi-Automatics of the single-spindle type and four-spindle Power Indexing type are also included in the company's complete line of finishing machinery.

For complete information, write:
Hammond Machinery Builders,
1614 Douglas Ave.
Kalamazoo, Mich.



WHO

MAKES QUALITY SCREW MACHINE PRODUCTS

It's no question . . .
it's a fact!

When you need cap screws, set screws, milled studs or coupling bolts of any machineable material and with *any* thread, remember . . . WHO makes them better.

WHO is... *Wm. H. Oettemiller* Co.
YORK, PENNA.

Write for name of nearest distributor and our free illustrated folder.

under the surface OF YOUR WORN CUTTERS



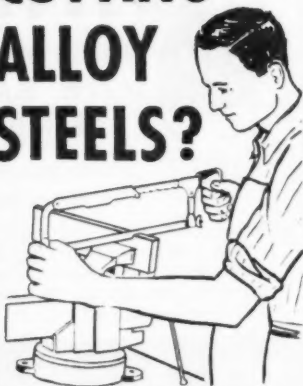
RUTLAND TOOL SERVICE can uncover important savings for you through recutting worn tools to original spiral and tooth form. Replacement of carbide tips especially on multi-tipped round tools will effect a definite saving in your tool costs.

Send for Literature and Prices.

RUTLAND TOOL SERVICE
13006 Greeley, Detroit 3 TOWNSEND 8-1661

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HIGH SPEED

CUTTING ALLOY STEELS?



**Then TECHNITE is
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In hard cutting work — on stainless and alloy steels — *Technite* blades are the most economical blades to use. They deliver more service per dollar cost — cut at a high speed — save operator's time. Made of a special analysis molybdenum high speed steel and further toughened by Capewell's improved heat treating method, *Technite* blades stand up longer and cut faster on the most difficult jobs. See for yourself how *Technite* will save you time and money. Ask your distributor for *Technite*.

The CAPEWELL
Manufacturing Co.

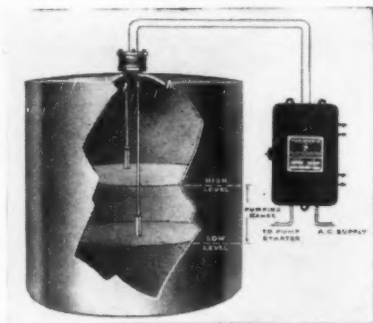
HARTFORD, 2, CONN., U. S. A.

ITAL WORKING CRAFTSMEN FOR OVER 65 YEARS

PHOTOSWITCH LIQUID LEVEL CONTROL

Photoswitch Incorporated announces its Level Control Series 10, a maintenance-free level control for the chemical and food processing fields. Contact with the liquid is made only through stainless steel probe rods. No floats or other moving parts are required in the tank. The control consists of an electrical relay operating from a probe circuit through a transformer and a rectifier—no vacuum tubes are used. Accuracy is independent of temperature and pressure.

The Series 10 Level Control is recommended for all electrically conductive liquids, such as acids, salts, nitrates and sulphates. Positive operation is assured by the feature which permits the probe circuit to be set at several different sensitivities to match the electrical resistivity of the liquid being controlled. It is, therefore, not affected by the saturated vapor above the liquid in a closed tank, permitting positive control of acid in batch processing. It will discriminate between a liquid and its form, which is important in handling dairy and certain pharmaceutical products.

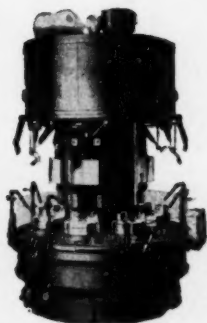
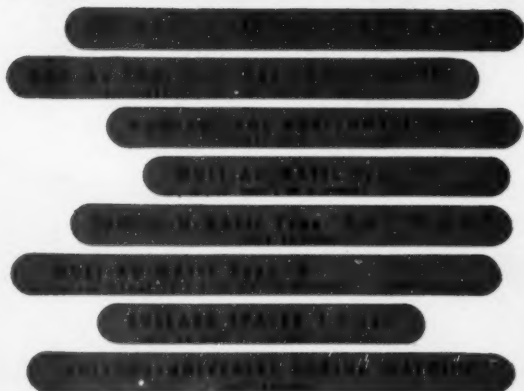


As indicated in the above sketch, the two probe rods which are wired to the control, project into the tank to the levels corresponding to the low point, where pumping is to start and the high point, at which pumping stops. When the level of the liquid in the tank falls below the lower probe, the level control closes the electrical circuit controlling the pump or valve. When the liquid rises to the level of the upper probe, the fluid acts as a conductor of the minute current at low voltage required for operation of the relay and the central circuit opens.

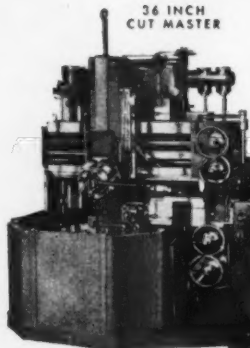
for your information



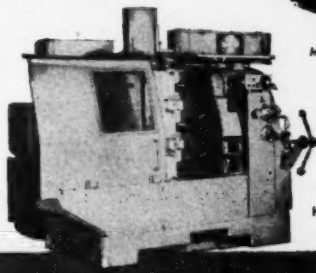
the **BULLARD** complete line



TYPE "D"
MULT-AU-MATIC



36 INCH
CUT MASTER



30-H
HORIZONTAL
LATHE

BULLARD

BRIDGEPORT 2, CONNECTICUT

CUT HEAVY and LIGHT STOCK Both **NIAGARA**

You don't have to adjust knife clearance on Niagara Power Squaring Shears every time you cut a different thickness of stock! Niagara capacity ratings are maximum capacity ratings, and they cut any thickness of stock up to their top rating **WITHOUT TINKERING WITH THE KNIFE ADJUSTMENT.**

And to prove it, look at the photograph at right...one man is cutting a 20 gage sheet and the other is cutting 5/8" plate **BOTH AT THE**

SAME TIME, AND WITH THE SAME KNIFE ADJUSTMENT, AND WITH THE SAME GOOD RESULTS.

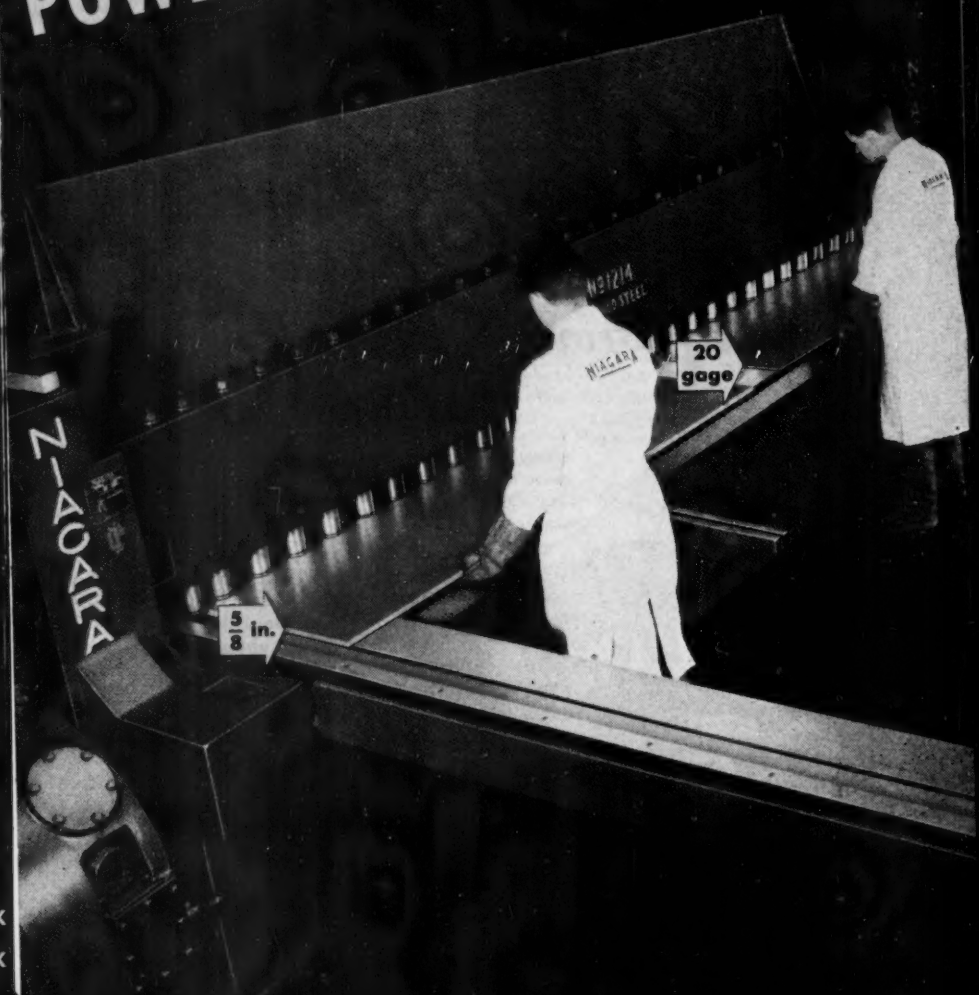
This is done daily in our own plant on our own work. We gladly demonstrate.

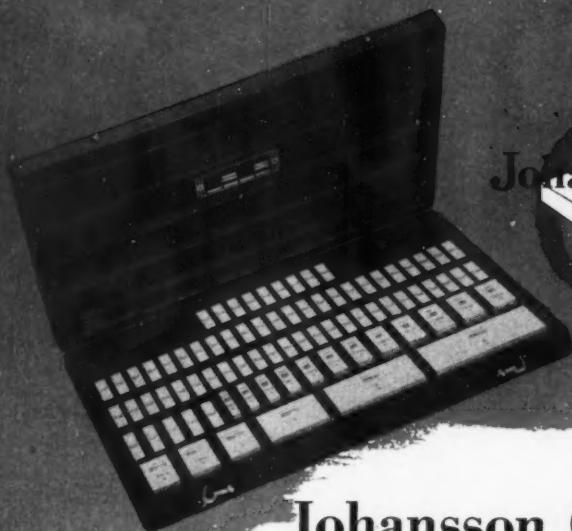
It speaks for Niagara design, Niagara rigidity, Niagara strength and the recognized ability of Niagara shears to deliver more working strokes per hour.

Write for bulletin.

NIAGARA MACHINE AND TOOL WORKS, BUFFALO 11, NEW YORK
DISTRICT OFFICES: DETROIT, CLEVELAND, NEW YORK

at the Same Time on
POWER SQUARING SHEARS





Johansson Gage Blocks *now available through* ***Brown & Sharpe Distributors***

NEW CATALOG

Send for a copy of
the latest catalog on
all Johansson Gage
Blocks and Accessories
... now made by
Brown & Sharpe. It
contains detailed in-
formation and illus-
trations.

These famous precision standards of industry are conveniently accessible through Brown & Sharpe Distributors. Thus, industry is assured a continuing dependable source of supply for JO-BLOCKS and Accessories.

With the purchase of the Johansson Division from Ford Motor Company, Brown & Sharpe acquired all rights to manufacture and distribute Johansson Gage Blocks and Accessories throughout the Western Hemisphere. Since that time, it has obtained the rights to world-wide distribution.

The Brown & Sharpe name is industry's guarantee that the traditional precision of these Johansson products will be maintained without compromise. Brown & Sharpe Mfg. Co., Providence 1, R. I., U. S. A.

We urge buying through the Distributor

BROWN & SHARPE

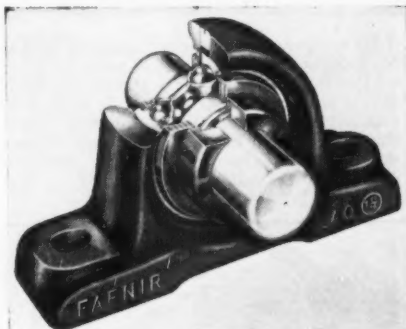


The equipment is flexible to serve as a pump-up or pump-down control, a high or low level safeguard, and to provide for the sequencing of two or more pumps. Send for Bulletin PF 479 for complete specifications.

Photoswitch Inc., Dept. BB
77 Broadway
Cambridge 42, Mass.

RUGGED NEW FAFNIR PILLOW BLOCK

Now in production, a new series of pillow blocks equipped with Fafnir Mechani-Seal Ball Bearings is announced by the Fafnir Bearing Co. Designated as the LAO Series, this line is being produced in nine shaft sizes ranging from 1-3/16" to 2-15/16".



Each LAO incorporates a heavy series ball bearing with wide inner ring and exclusive self-locking collar, making installation on a shaft simple and removal easy. The featured Mechani-Seal is a labyrinth type closure plus an external slinger member to throw off contaminants when operating at normal speed. For added protection at low speeds or under adverse atmospheric conditions, a combination synthetic rubber and felt washer has been incorporated as an integral member of the seal.

The bearing has a spherical outside diameter which, when mounted in its corresponding spherical housing, provides unrestricted self-alignment in any direction. The pillow block housing is a compact single piece, reinforced at all stress points to take shock loads.

For further information, write Truman L. Hunt, Advertising Manager, at:
The Fafnir Bearing Co., Dept. BB
New Britain, Conn.

SAVE TIME, MONEY

with rugged
QUEEN CITY GRINDERS



A battery of Low-Cost Queen City Grinders is real production insurance. Placed conveniently throughout your plant, they'll stop wasted work-hours caused by "ganging up" around one lone grinder. Low in cost, Queen City Grinders quickly pay for themselves in production gained. Write for Catalog.

QUEEN CITY

MACHINE TOOL CO.

235 E. 2ND ST.

CINCINNATI 2, OHIO

ACETATE-FILM-BACKED TAPE HAS HIGH TEAR RESISTANCE

A second "Scotch" brand filament tape for heavy duty packaging was recently made nationally available by Minnesota Mining and Manufacturing Co.

Designed with an acetate film backing instead of paper, the new tape is waterproof, and is thinner than the paper-backed filament tape, making it easier to handle and enabling packages banded with it to slide freely.

The caliper of the acetate film tape is 7-9 mils as compared to 13-15 mils for the paper backed tape announced in the February issue of the Machine and Tool Blue Book, on page 259, by the 3M Co.

Both tapes have a tensile strength of 180 pounds per inch of width, and a tear resistance greater than the 1600 gram-centimeters that can be measured on the ASTM-approved Elmendorf Tear Tester.



Its toughness, it was announced, is due to a new type of tape construction in which thousands of long threadlike filaments reinforce the backing, as steel rods reinforce concrete. The filaments—more than 5,000 per inch of tape width—are continuous elements of high strength rayon fibre similar to that used to im-

NOTCHING TUBING OR PIPE ENDS EASILY WITH

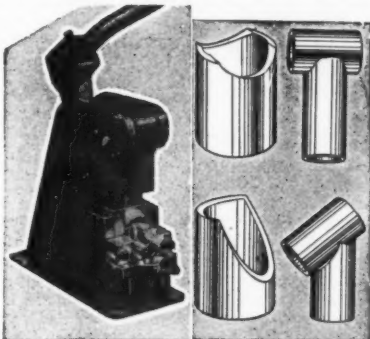
ARC-FIT

Patent No. 2,126,519

IN POWER PRESS OR HAND PRESS

Arc-Fit is a notching unit for preparing pipe or tubing ends in making welded or brazed tubular joints. Arc-Fit will prepare the ends of a pipe or tube in less than 5 seconds. Arc-Fit is a production tool that will cut your production costs. It is applicable in any industry where pipe or tubular construction is used.

- Arc-Fit can be utilized in any power press.
- Arc-Fit can be furnished for any size tubing or pipe.
- A hand press can be supplied with Arc-Fit units for shearing pipe or tubing sizes 2 inches or under.



- For sizes over 2", angular cuts other than 90°, and slotting operations. Quotation furnished on request.
- Arc-Fit does not deform pipe or tube. No grinding or finishing operation is needed.
- Engineers can now design for tubular construction and cut costs.

Write today for circular and prices.

Manufactured Exclusively by

VOGEL TOOL & DIE CORPORATION

2525 Moffat Street

Chicago 47, Illinois

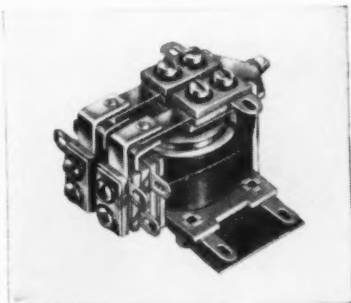
part extra strength and shock resistance to auto tires.

The tape needs no application equipment. It is designed for packaging metal pipes, rods, sheets and coils by being wrapped once around the load and back on itself. Its pressure-sensitive adhesive grips immediately on contact. It is also expected to be used in some palleting operations, and for shipping metal cabinets, raw lumber, wall board, plastic sheets, etc. For complete information, write:

Minnesota Mining and Mfg. Co.
900 Fauquier St., Dept. BB
St. Paul 6, Minn.

NEW COOL-RUNNING MIDGET RELAY

A new midget relay that features small size, plus cool-running operation even under constant duty, has recently been announced by Comar Electric Company. According to the manufacturer, this relay was developed for use in equipment where compact size and cool operation was specifically required. It is adapted for use in enclosed units and shielded control panels requiring a small size, efficient relay that must run cool at all times.



The overall size of the unit is only 1 1/4" high, 1 3/4" wide and 1 7/8" long. It comes available in any combination of switches up to double-pole, double-throw. Standard contacts are of fine silver, rated up to 5 amperes. The device's power consumption is from 1 to 2 watts. Mounting is single center stud type. The relay can be supplied for use on standard voltages up to 110 volts a.c. or d.c. For complete details, write:

Comar Electric Co., Dept. BB
3148 N. Washtenaw Ave.
Chicago 18, Ill.

Buy KIPP AIR GRINDERS Because

The RPM's stay up while grinding ... not only when the grinder runs idle.

It is an established fact that surface speeds must stay up to approximately a mile a minute if you want to grind — not just rub. The speed of Kipp air grinders drops but slightly when put to work. That means better work — longer wheel life.

Buy Kipp air tools for best results, lower prices.

MODEL JA
50,000 R. P. M.

\$42⁰⁰

IN U. S. A.



Weight 12 ounces;
length 6 3/4 inches;
chuck size 1/8 inch.
Wheel guard removed for better illustration.

MADISON-KIPP CORP.
207 Waubesa St., Madison, Wis., U. S. A.

- Skilled in DIE CASTING Mechanics
- Experienced in LUBRICATION Engineering
- Originators of Really High Speed AIR TOOLS

**ASK AN EXPERT
ABOUT
FAST, LOW-COST
METAL CUTTING**

YOUR VICTOR DISTRIBUTOR



Want to make sure you're using the best blade for whatever type metal or non-metal you're cutting? Then see your Victor distributor. His long experience qualifies him as an expert on hack saw blades, and he'll be glad to give you any help you need. He can show you how to make every stroke count with Victor blades . . . how to cut faster, easier and more economically.

While you're at it, ask him for a free copy of the Victor Metal Cutting Booklet for your pocket or tool kit and the Victor Wall Chart for your shop. Both are packed with helpful hints on selection, care and use of hand and power hack saws.



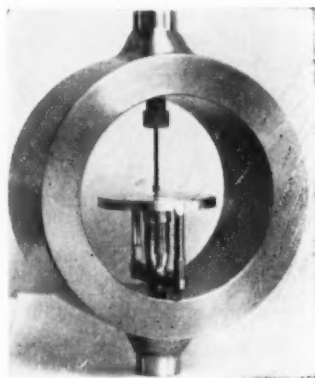
3709

VICTOR SAW WORKS, INC.
MIDDLETOWN, N. Y., U. S. A.
Makers of Hand and Power Hack Saw Blades, Frames and Band Saw Blades

PROVING RINGS FOR CALIBRATING TESTING MACHINES

Experience in laboratories in using testing machines that apply forces to engineering material and structures has indicated the advisability of frequent periodic calibration of such machines, if reliable test results are to be obtained. For accurate results, it is necessary that the calibration include loads up to the capacity load of the machine. Because the standard weight and proving lever methods were inadequate for calibrating all types of small testing machines, and particularly because they were not adequate for calibrating large testing machines, experiments were undertaken more than 20 years ago with portable elastic devices which could be calibrated under accurately known forces, then transported to the testing machine and used to measure the forces applied by the testing machine. These experiments led to the development of the proving ring.

A proving ring is defined as an elastic steel ring, suitable for calibrating a testing machine in which the deflection of the ring, when loaded along a diameter, is measured by means of a micrometer screw and a vibration reed mounted diametrically in the ring.



The Proving Rings recently introduced by Morehouse Machine Co. are made in two types: the compression type for calibrating testing machines in compression only is made in capacities from 1,000 to 300,000 pounds. The calibration range is from 100 to 300,000 pounds. The illustration shows a proving ring of 300,000 lb. capacity, compression type

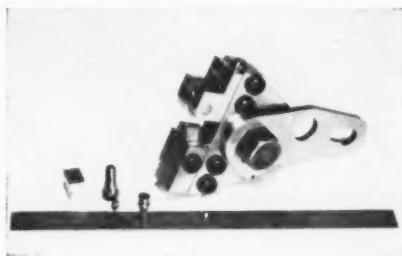
which has a calibrating range from 30,000 to 300,000 pounds.

The combination tension and compression type, for calibrating testing machines in both tension and compression, is made in capacity from 2,000 to 100,000 pounds. The calibrating range is from 200 to 100,000 pounds. For further descriptive information, write:

Morehouse Machine Co.
233 W. Market St., Dept. BB
York, Pa.

THE "LITTLE SHAVER" TOOL FOR B & S AUTOMATICS

An efficient and useful shaving tool holder designated as the "Little Shaver" has recently been placed on the market by the Brunette Tool Co. It is designed for use on Brown & Sharpe Automatic Screw Machines, regardless of their age or condition.



The "Little Shaver" is made in three sizes, and is compact and light enough for the smallest job on the B & S yet is rugged enough for the largest work. The tool is claimed to be able to give consistently better finishes and closer tolerances. The user simply replaces his standard circular form tool with the "Little Shaver"; it has been designed for the standard tool holder.

The setting is simple, and many parts can be shaved by using the standard tool and roll. Rolls and tools to suit special purposes can also be supplied on prompt delivery.

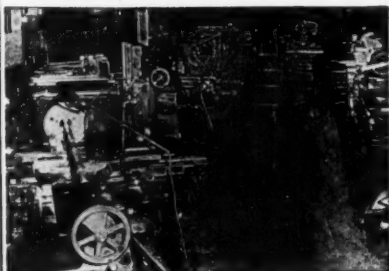
The manufacturer states that the "Little Shaver" will retain its size day after day, without adjusting or sharpening, thereby eliminating much normal down time usually incurred. For complete specification sheets, write:

Brunette Tool Co.
Stanley St., Dept. BB
New Britain, Conn.

INTRODUCING ...

M.F.P.

Machine Shop Floor Patch



GREASE & OIL RESISTANT

Shipped in Complete Unit!

FLEXROCK M.F.P. has been carefully developed to meet and overcome the conditions existing in machine shops. Thorough tests have proved that it offers so much resistance to grease and oil disintegrators as to give absolutely satisfactory service on machine shop floors.

ADVANTAGES

- (1) M.F.P. offers extremely high resistance to oil and grease, is shockproof and provides the maximum of foot-ease and light reflection.
- (2) M.F.P. is far more grease resistant than other patching materials. It requires only 1/2 inch "chip out" around edges.
- (3) In addition to its shatter-proof properties, M.F.P. has a surface hardness and smoothness reducing load-drag to the minimum.
- (4) M.F.P. can be applied over concrete or wood, and is of the same color as concrete.
- (5) It is shipped as a complete unit—there is no sand, stone, cement nor any other material to buy.
- (6) M.F.P. is extremely easy to apply and a good job can be done by anyone who will follow the simple directions.

Write for New Folder

FLEXROCK CO. 3634 FILBERT STREET
PHILADELPHIA 4, PA.

M.F.P.

(MACHINE SHOP
FLOOR PATCH)



GEARS

Small and Medium

SPURS
(internal
and external)

HELICALS

STRAIGHT
BEVELS

SPROCKETS

RACKS

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WORM
GEARS

THREAD
GRINDING



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TRAINS

Send us your blueprints for estimate

BEAVER
GEAR WORKS, Inc.
1633 Parmelee St., ROCKFORD, ILL.

GRINDER



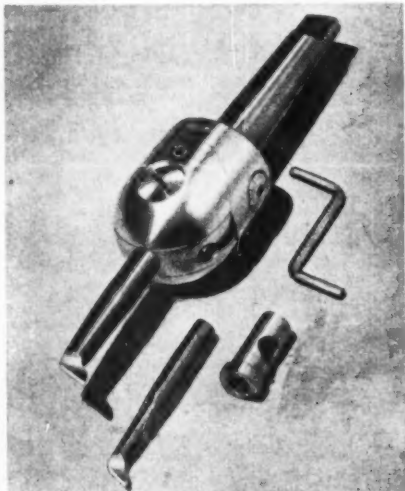
CUTS LABOR 50%

in welding shops, foundries and metal fabricating companies.—Powerful, lightweight 3 phase. Write today for bulletin.

GASTON POWER TOOLS
14829 Loomis St. Harvey, Ill.

NEW BRITISH BORING HEAD WITH RADIAL OFFSET

An unusual and useful new tool has recently been introduced to the American metalworking field. This is the new A.B.C. Boring Head with a radial offset, a development of Pearson Phillips Ltd., well-known London manufacturers. Unlike the conventional boring head, which usually employs the familiar sliding-type offset, this new device offsets radially.



The A. B. C. Boring Head remains in balance regardless of the diameter of the cut, permitting the use of speeds up to 1200 r.p.m. A high degree of accuracy can be maintained by the simplicity of the radial adjustment. The tool has a capacity of from $\frac{1}{2}$ " to 6". It may be used in milling machines, drill presses or lathes, with equal efficiency, according to its manufacturers. The head is equally suitable for use by using either English or metric dimensions.

The 2" body diameter of the A.B.C. Boring Head is dome shaped, having no dangerous protrusions. The adjustment of the offset is obtained by means of an Allen key provided; the same key is also used for locking the head for continuous runs of constant diameter boring.

The tool may be fed in steps of .001", but is capable of taking cuts up to .06". Two boring tools of $\frac{3}{8}$ " and $\frac{1}{2}$ " are supplied, together with an adaptor sleeve

for the smaller tool. The Boring Head is provided with either a No. 2 or No. 3 Morse taper shank. Complete specifications on the A.B.C. Boring Head will be sent upon request to:

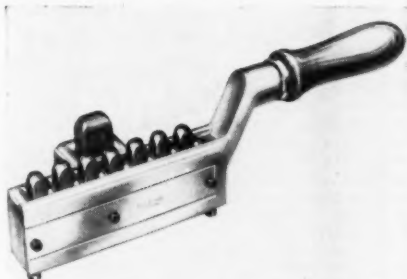
Pearson Phillips Ltd.
194-196 Finchley Road, Dept. BB
London N.W. 3, England

NEW PLATE AND PIPE MARKING HOLDER

The "Safety" Luminum-Line Plate and Pipe Marker, weighing 50% less than the regular steel stamp holder, has been developed by M. E. Cunningham Company. Adaptable to all heavy-duty marking requirements, this new lightweight Aluminum Holder is stated to be easier to operate than heavier steel-fabricated holders, and yet offers the same dependability and long service life.

The new steel stamp holder is cast from tough aluminum alloy, and incorporates the Cunningham Friction Retaining Springs for quick change of steel stamps. The holder is designed with a flat bottom and replaceable metal feet which enables it to be carried along hot steel plates without damaging the stamps.

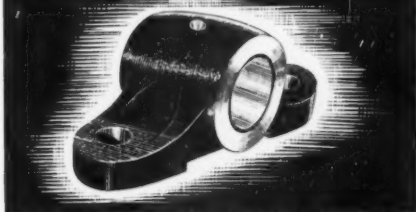
V-shaped runners are furnished with the tube and pipe-stamping holders to permit positive positioning on round objects. The top side of the holder has rounded ribs around all stamp holes to resist hammer blows.



Holders are made in any size or style, and for any size, number or combination of stamps. For complete details on the new Cunningham Aluminum Marking Holder write:

M. E. Cunningham Company
228 E. Carson St., Dept. BB
Pittsburgh, Pa.

PRECISION



POROUS BRONZE BEARING PILLOW BLOCKS

• Accurately machined from finest grey iron castings available, this block contains an oil-impregnated, porous bronze bushing — "the bearing with a million oil wells". Designed for installation from specifications, the PRECISION blocks runs indefinitely with no oil drip. For a rugged pillow block with long, trouble-free life, turn to PRECISION.

PRECISION PRODUCTS Co.

DIVISION of ATLANTA TOOL CO.
290 SIMPSON ST., N.W. ATLANTA, GA.

ALMOND DRILL CHUCKS



Maximum gripping power with
extreme accuracy and long life.

Write for Catalog

T. R. ALMOND MFG. CO.
ASHBURNHAM, MASS.
U. S. A.

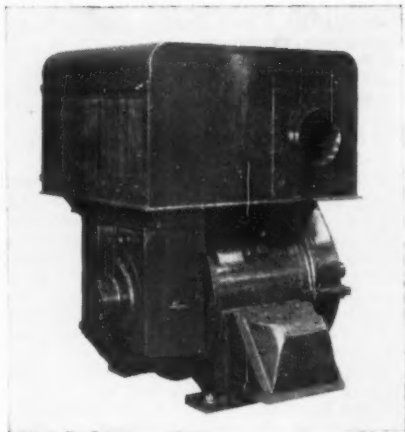
G-E STANDARD UNIT-COOLED D.C. MOTORS

General Electric standard totally-enclosed unit-cooled d. c. motors in ratings up to 200 h.p. now are available with a new type cooling assembly which enables them to operate at slow speeds for long periods of time, the company's Large Motor and Generator Division has announced.

Two blowers, driven by a single G-E Tri-Clad induction motor, in the air-to-air cooling assembly provide ventilation independent of motor speed. One blower circulates internal air through the motor and unit cooler, while the other blows external air through the cooler. The new cooling system makes full torque possible down to almost zero speed continuously.

The unit cooler is built of pressed-steel sheets which have been stacked and welded together at the edges to provide alternate air passages at right angles to each other. Upon entering the cooler, clean air from the motor is broken up into small streams by multiple passages, which are surrounded by similar streams of cool air coming from the outside.

Motor air never comes into contact with the contaminated outside air. The outside air, flowing through the alternate



set of passages at right angles to the external passages, absorbs the heat from the internal air stream.

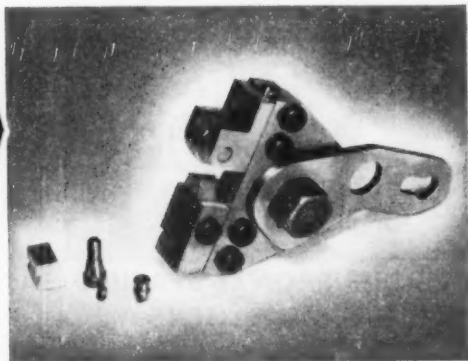
Designed for operation in dusty, dirty, and oil-laden atmospheres, G-E totally-

CLOSER TOLERANCES

REDUCED DOWN TIME

BETTER FINISHES

GET ALL "3"



WITH THE LITTLE SHAVER

The LITTLE SHAVER, designed for operation on Brown & Sharpe automatic screw machines, is adapted to standard tool holders in the same manner as a circular form tool. Sturdy, compact and simple in adjustment, the LITTLE SHAVER with standard or special formed tool and roll is the answer to your close tolerance problems all day long. And LITTLE SHAVER is inexpensive, too!

Send for complete information and prices. Consult us for special cutting tools of all kinds, including carbide.

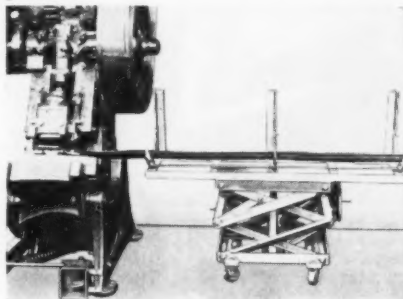


enclosed, unit-cooled motors require no piping, duct-work, air filter, or pressurized air supply. Additional information is available in Bulletin GEA-4469-A, which will be sent upon request. Write:

General Electric Co., Dept. BB
Schenectady 5, N. Y.

MONTGOMERY TILTING SHEET-FEEDING ATTACHMENT

A new tilting sheet-feeding attachment for their elevating table has recently been developed by Montgomery & Company's Materials Handling Division. The device is manufactured of steel throughout, and has eight angular adjustments up to 45°. The specifications of the sheet-feeding attachment include a rack width of 20", a maximum rack length of 72". The rack's capacity is 1,000 pounds; its weight is 100 pounds.



In combination with the Montgomery Elevating Table shown in the illustration above, the sheet-feeding attachment is said to be a useful piece of equipment for any press room. Descriptive literature on this unit can be obtained from the manufacturer upon request. Write:

Montgomery & Co., Inc., Dept. BB
53 Park Place
New York 7, N. Y.

HYDRAULIC SEQUENCE VALVE

A new sequence valve has been added to its line of oil hydraulic valves by the Gerotor May Corporation. The new Model 8822 valve prevents flow into a branch circuit until the pressure in the main circuit has reached a predetermined amount.

Improved features of this new device include a hydraulically balanced piston with an extra-large bearing surface; spring guide; hardened, ground and lapped plunger; single diameter bore; piston stop; and large diameter plunger.

Direct-operated by the pressure in the

*The most versatile
fixture for quick
accurate indexing
...SUPER-SPACER*

This fixture allows rigid control of accurate machining operations within its scope at speeds and feeds limited only by the capacity of the holding means and the power of the machine.

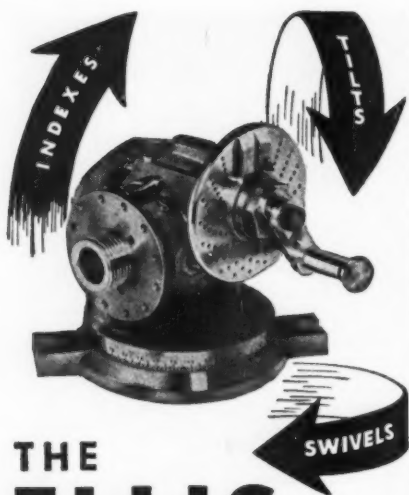
Standard mask plates have 2, 3, 4, 6, 8, or 12 divisions. Specials made to order. All Super-Spacers come complete with mask plates, Universal chuck and chuck wrench. Write for Bulletin S-101.



HARTFORD

Special

The HARTFORD SPECIAL MACHINERY Co., Hartford 5, Conn.



THE ELLIS DIVIDING HEAD

Many unique features make the ELLIS Dividing Head more than an ordinary indexing fixture. It is a precise, rugged unit with $6\frac{1}{2}$ " normal swing increased to 11" swing through the use of riser blocks. It TILTS more than 100 degrees in the vertical plane—SWIVELS 360 degrees in the horizontal plane—INDEXES by crank, or directly by hand. Work is held between centers, or in chucks or collets. The ELLIS Dividing Head is a universal work head that will increase the production versatility of your milling machines, grinders, drill presses and jig borers—write for complete details today.



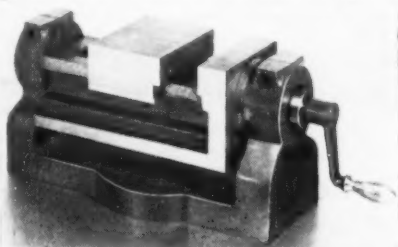
"in"port, these valves are available in two pressure ranges of 50 to 500 p.s.i., and 500 to 1500 p.s.i., with adjustment from minimum to maximum in each range. Seven sizes range from $\frac{1}{4}$ " to $1\frac{1}{2}$ ".

Catalog section No. 201 illustrates and describes the new sequence valve. Write:

Gerotor May Corp., Dept. BB
Baltimore 3, Maryland

TRUNION VISE AND ANGLE PLATE IN ONE UNIT

A useful combination trunion vise and angle plate, a rugged small unit with a wide variety of uses in machine shop and tool room, has just been introduced by Conrad Machine Co. The trunion-mounted vise measures 5" x 5" x $1\frac{1}{4}$ "; it is backed by a 5" x 10" surface plate, provided with two $\frac{3}{8}$ " T-slots. The plate



can be rotated 360° and clamped at any angle to accommodate index and angle work on such units as milling machines, grinders or drill presses. The angle plate and top of the vise jaws present true ground surfaces which are suitable for laying out work. The jaws are faced with tool steel plates which have been left unhardened in order that they may be grooved or tapped for special set-ups.

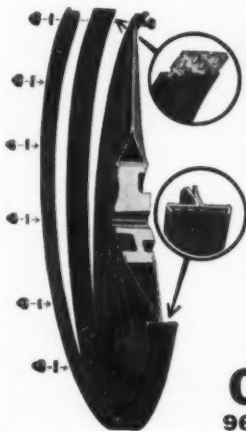
Acme threaded screws of 10-pitch and stress-proof material pass through the center of the trunion bearing so that the vise can be rotated and reset at any angle without disturbing the work clamped.

If the work piece is of such shape or size that it is impractical to clamp it in the vise, it can be bolted down to the T-slotted surface plate; in this way, any number of angle operations may be finished in one setting. The trunion bearings have been made large for positive clamping with little effort, and are sturdy enough to withstand heavy milling cuts, according to the vise's manufacturer.

For complete details, write:

Conrad Machine Co., Dept. BB
State Road No. 53 and Hoy Road
Lombard, Illinois

Free Data on Cost Reducing,
Output Increasing
Accessories with which to
Modernize Your
**BAND-SAW
MACHINES**



- ★ Carter Micro-Precision Guides
(Upper Right)
- ★ Carter Quick-Change Tires and
- ★ Rigid Band Saw Wheels (Left)
- ★ Carter Guide-Line Lights

Ask for Our "Case Stories" Bulletin

CARTER PRODUCTS CO.
960 Michigan Trust Bldg., Grand Rapids 2, Mich.

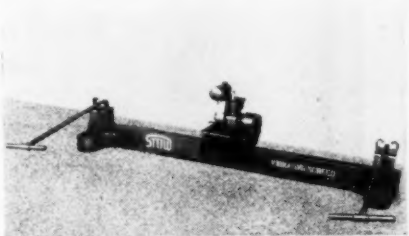
STOW VIBRATING SCREED FOR CONCRETE WORK

The Stow Manufacturing Co. has recently introduced a new gasoline-powered Vibrating Screed. This new unit, which is almost self-propelling, handles large slabs, roadways, floors, aprons and many other concrete jobs. With this new Screed, two operations can strike-off a slab 12 feet wide and 10 inches thick . . . even in the stiffest concrete. The new Screed leaves the surface of the slab so true to grade that is is practically finished. The manufacturer claims that 300 cubic yards of 8-inch slab can be placed in less than 8 hours. It also eliminates hand-puddling and spading.

The complete unit includes a sturdy 1½ h.p. Power-Pak, with a built-in vibrator, mounted on heavy brackets, which are bolted to the beam. The engine base plate is mounted on four multiple vibration dampeners to absorb the Screed's vibration in both the vertical and horizontal planes. This engine mount makes possible long, continued usage without excessive wear. End roller supports are attached at each end of the beam by means of standard rubber vibration dampeners. Vertical adjustment is provided

so that the beam may be elevated out of contact with the side forms.

Four sizes are furnished, providing spans of 6, 8, 10, and 12 feet. All beams are 3" wide and have depths of 8, 10 and 12 inches. The Power-Pak unit, together with all essential parts and acces-



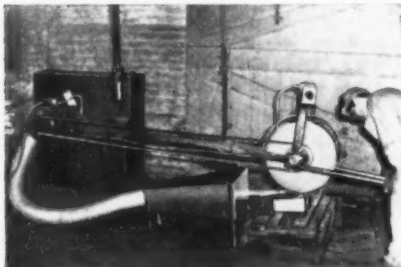
sories, can be acquired separately in the event the contractor has his own beam.

Write for complete information to:
Stow Manufacturing Co.
30 Shear St.
Binghamton, N. Y.

SWING GRINDER DUSTS COLLECTED WITH DUSTKOP UNIT

Dust from swing frame grinding operations can often be controlled without the necessity of either a booth or the large volumes of air needed for big enclosures.

One example of an installation with only a low cost portable hood instead of a complete enclosure, employs a standard Model 1150 Dustkop dust collector for the disposal of the collected dust.



The Dustkop is a self-contained unit requiring no duct work for its installation, such as wall cutting, etc. A paddle wheel fan driven by a 1½ h.p. motor develops a suction of 1400 c.f.m. at the inlet.

The collected dusts are removed from the air stream in two stages; first, a cyclone separator is for the purpose of taking out the larger dusts, while a spun glass filter, comprising a second stage filtering medium, is provided to remove the finer dusts before the cleaned air returns to the working space. Considerable heat is saved by this feature of recirculating air rather than exhausting it outside, according to the manufacturer.

A saving of several weeks time was made since the dust collector was obtained out of stock, while the hood, of simple construction, was built in a few hours.

The dust collector and the hood were connected together by means of standard flexible metal hose; the connection to source of power being the only other installation work required before the entire equipment was ready for operation.

To accommodate dusts from work of different thicknesses, the legs of the hood were made adjustable.

For work that is considerably larger than the unit illustrated, a hood of larger face will be used. However, in order to

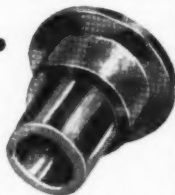
LEAD SCREW TAPPING . . .

ON YOUR OWN DRILL PRESS!

With this ROTOREX tapping head you can convert your drill press to a precision tapping machine in a matter of minutes, and consistently produce Class III threads. To change to drilling, simply swing the ROTOREX to one side.

CHECK THESE FEATURES:

1. Positive, automatic control of lead.
2. Hardened, precision ground lead screws.
3. Instantaneous emergency reverse.
4. Complete automatic cycle.
5. Accurate control of depth—accuracy to .010.
6. Foot control frees operator's hand for loading.
7. Capacity 0-80 to ¾".
8. Price complete, \$195.00. F.O.B. factory.



Precision ground lead screw provides accurate, controlled tapping from 0-80 to ¾".



HUNTER-DOUGLAS CORP.

Blaine & Pachappa Sts.

Riverside, California

maintain effective face velocity of the air, a baffle (a sheet of metal suspended even with the face of the hood) will be used. It is smaller than the total opening of the hood so that there is a space about 2" wide around its entire edge. Thus, the suction is spread around the edge of the hood. Heavy dusts which are thrown off with considerable force by the speed of the wheel will strike the plate and drop down to be taken into the air stream at the bottom of the hood. Lighter dusts, which have a tendency to remain suspended in the air, will enter the hood at the sides and along the top. For further data on this, and similar units, write:

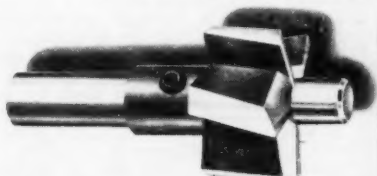
Aget-Detroit Company
318 Main at Washington Sts.
Ann Arbor, Michigan

HIGH SPEED COUNTERBORE FEATURES POSITIVE CHIP CLEARANCE

A new type counterbore has recently been developed by Aircraft Tools, Inc., manufacturers of fabricating tools for the aircraft, automotive and railroad industries.

Precision-made of high-speed steel, this counterbore features extra heavy tooth construction, extreme shortness—only 2"

overall length, more flutes for cleaner and smoother cutting, and positive chip clearance. The cutting edge is thick enough to dissipate heat quickly, thereby making possible faster feeding. For complete flexibility, this new counterbore, designated the AT-488, has interchangeable pilots available in all sizes, is produced in a complete range of sizes, in



both straight shank (for chucking in drill motors and drill presses) and tapered shank, which can be used directly in the machine spindle thereby eliminating holders and adapters.

Information on this new tool is available from:

Aircraft Tools, Inc., Dept. BB
2306 E. 38th St.
Los Angeles 11, Calif.

Beverly

THROATLESS SHEAR



- UNIVERSAL . . . makes intricate, angular, radii and straight cuts with equal efficiency.
- Positive rake produces neat, clean edges free of burr.
- Free-cutting . . . handles lightest material without distortion.
- Compound leverage . . . great power with little effort.
- High grade tool steel blades adjustable for wear. Easily replaced.
- B-3 Model (illustrated) has ballbearing hold down for easy control of heavier gauges. Beverly Shears also available with H.C.H.C. blades for handling Stainless.

See your Dealer . . . or write direct for information and illustrated Catalogs.

Made in 3 models to handle 14 gauge, 10 gauge and 1/4". Welded, all-steel stands available for Beverly Shears.

The BEVERLY SHEAR
MFG. Co.
3005 W. 111th St.
Chicago 43, Ill.

SELF-ALIGNING PILLOW BLOCKS PERMIT RAPID INSTALLATION

Stressing the advantages of quick, simple installation, self-alignment and ease in servicing, Boston Gear Works offer a new pillow block (illustrated) and a new flanged cartridge. Both of these new devices are equipped with a self-aligning bearing. A spherically ground o.d. reduces the mounting time, since the bearing aligns itself on the shaft.

Smooth running through an extended service life is assured by the inclusion of high quality ball bearing alloy steel races and chrome alloy steel balls. The inner race is locked to the shaft by two knurled cup-point set screws which are set at 120°. A new oil resistant seal of labyrinth design provides a dirt-free lubrication chamber. The seal is integral with the bearing, thus its design allows excess grease to escape without the danger of blowing out the seal. The bearing is prelubricated, and can be placed directly in service. An alemite fitting makes regreasing easy and convenient.

Rigid mounting is provided by a solid, one-piece cast iron housing. Slotted holes



in the base make bolting down a simple procedure. Both the new flanged cartridges and the pillow blocks are available for shafts of from $\frac{1}{2}$ " to $1\frac{1}{4}$ " diameter. For complete data, write:

Boston Gear Works, Dept. BB
Quincy 71, Mass.

CLARK TEST BLOCKS AND DIAMOND CHECKING SET

As part of a complete line of hardness testing equipment, Clark Instrument, Inc., announces a series of precision test blocks. These devices assure unusually accurate test readings, the manufacturers state, because they are held to extremely close tolerances and have an exceptionally fine



finish. While specifically manufactured for use with Clark "Rockwell" Hardness Testing Machines, they give accurate results on any "Rockwell" type hardness tester. The test blocks are available in hardness grades for all "Rockwell" scales.

In addition to these standard test blocks, the company presents a deluxe Master Diamond Checking Set (illustrated). This includes a gold plated diamond penetrator and two test blocks—one for the higher, and one for the lower range of hardness values. The diamond penetrator is intended for use only when checking the owner's machine, thus assuring accurate test readings. The set is furnished in a leather-finished case that protects the penetrator and test blocks when not in use. Full specifications may be obtained by writing:

Clark Instrument, Inc., Dept. BB
10200 Ford Road
Dearborn, Mich.

NEW ADJUSTABLE TAPPING HEAD

Errington Mechanical Laboratory, Inc., announces a new Adjustable Tapping Head that offers many advantages never before available. The new Errington Adjustable Tapping Head is a versatile tool which permits the operator to take advantage of a wide range of adjustments without overhang. It is fully geared, with needle bearings on all spindles in heads and ball thrust bearings throughout.

All parts are fully enclosed for pressure lubrication and protection. Non-slip

positive clamping is provided on all adjusting members. It is housed in a sand cast aluminum case. The Errington Adjustable Tapping Head is supplied with three spindles for equal adjustment in



line and 3, 4, 5 or 6 spindles for equal adjustable on bolt circles. For complete literature, write:

Errington Mechanical Laboratory, Inc.
Dept. BB
Staten Island 4, N. Y.

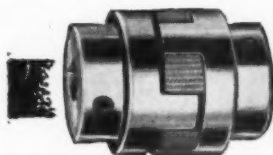
PUNCH PRESS PITMAN PROTECTS AGAINST OVERLOADS

The Dayton Rogers Manufacturing Co. has recently designed a new style punch press replacement pitman, adaptable to all punch press cranks for definite punch press overload protection, in sizes for press capacities from 25 to 250-ton.

This hydraulic overload jack and safety pitman automatically protects the press from all overload during the work cycle of a given punch press. The throw bearing, including the ram connection, is machined to size and specifications for fitting individual presses to their size and make.

These hydraulic jacks not only protect the press crankshaft from damage, including the press bed frame, but can be so calibrated to assure fragile dies maximum protection and avoid damage. The device can be installed quickly on any punch press, by merely replacing the present press pitman, strap or connecting rod. Write for illustrated bulletin page No. 85 2M:

Dayton Rogers Manufacturing Co.
2824 13th Ave., S., Dept. BB
Minneapolis 7, Minn.



LOVEJOY L-R FLEXIBLE COUPLINGS

The Right CUSHION MATERIAL for the Job!

Only with flexible couplings fitted to the peculiar requirements of the particular job can you be sure of maximum efficiency.

Write for this Catalog, and Selector Charts for all the data that will enable you to select the coupling suited to your application.

Write — Wire. Deliveries from stock.

Mfr. of Lovejoy Variable Speed Transmission Equipment and
Dix Universal Joints

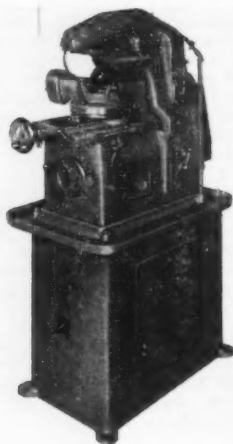
LOVEJOY FLEXIBLE COUPLING CO.

5024 WEST LAKE STREET • CHICAGO 44, ILLINOIS



GEAR HOBBER FOR SPUR, SPIRAL, OR BEVEL GEARS

A development in the field of precision gear generation is the new Hamilton No. 1 Gear Hobber, which hobs small spur, spiral, and bevel gears with high accuracy, and on fast production sched-



ules. It handles work from .050" to 6" o.d.; it is supplied with twelve hob speeds from 109 r.p.m. to 1259 r.p.m.; the hob spindle turntable swivels 105° to the left 135° to the right; it affords helix leads from .800" to 130", and operates on a 1 h.p. motor.

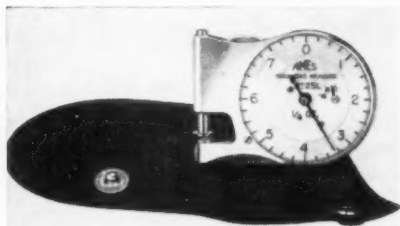
An outstanding feature of this new unit provides that speed, feed, and indexing can be selected independently. This adds great flexibility to the machine, enabling the quick selection of a speed and feed to suit the material being worked and any size gear being hobbled. It also greatly reduces set-up time, thus fitting the machine to the needs of the job shop as well as the large plant having long production runs.

Illustrated literature containing specifications will be sent on request to:

The Hamilton Tool Co., Dept. BB
Hanover at Ninth St.
Hamilton, Ohio

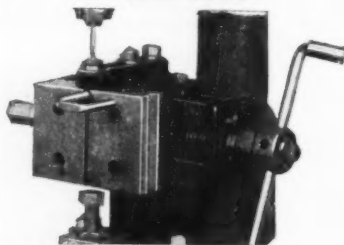
AMES THICKNESS MEASURE CALIBRATED IN LEATHER OUNCES

Another pocket-size Thickness Measure, calibrated in leather ounces, has been added to the B. C. Ames Co. Dial Thickness Measure line. The new gauge, designated No. 25L, can be carried in a vest pocket, and is a useful aid to leather manufacturers and buyers who must make on-the-spot checks of hides, leather strips and leather sheets.



The new instrument is built with the precision of a fine watch, yet is unusually rugged. With ordinary care, should last a lifetime. The large dial is calibrated in ounces, each graduation being equal to 1/4 oz. In addition, a small dial and pointer graduated in multiples of 8 oz. have been provided to allow check-

A QUICK SET-UP FOR ODD JOBS



**INTER-CHANGEABLE or
STANDARD "V" JAWS**
keep the Jigs in constant
operation and will handle
practically any production
job

HEUSER MFG. CO.

1638 N. Paulina St. Chicago 22, Ill.

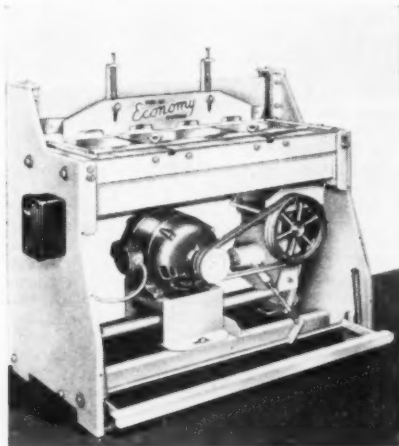
ing of leathers up to 20 oz. weight to the nearest $\frac{1}{4}$ oz.

The contacts are $\frac{1}{4}$ " diameter and open $\frac{5}{16}$ ". They are non-adjustable, thus assuring permanent alignment and parallelism. An unbreakable crystal protects the dial face. A grain leather, snap-button case and complete instructions are furnished with each Ames Dial Thickness Measure. Write for full details contained in a new bulletin just released.

B. C. Ames Co., Dept. BB
28 Ames St.
Waltham 54, Mass.

DIRECT DRIVE METAL SHEAR HAS 16-GAUGE CAPACITY

A new power-operated, 16-gauge capacity metal shear which incorporates a self-contained positive action, direct drive unit is introduced by the Acme Equipment Co., Inc. It is shown below with the front guard removed.



The new Economy P-16 shear eliminates flywheels, brakes, fast moving shafts and cam-operated connecting rods by utilizing the direct drive. The drive unit, which runs in oil, consists of precision-cut hardened steel worm and bronze worm gear units, sliding 4-jaw clutch, driver and cam, which gives the shear a smooth, direct action by a slight pressure on the foot treadle. One complete revolution, in which the knife bar is brought down smoothly and evenly for the cut and returned to top position,

is accomplished each time the foot treadle is depressed. Powered return of the knife bar to its "start" position is fast and positive without the use of tension springs. The cam actuated rocker arm transmits power to the knife blade through two steel connecting rods, which are provided with turnbuckles for adjustment.

The operating cycle of the shear is 60 strokes per minute, which can be varied, if desired. The new model is available in three cutting lengths—36", 42" and 52". It is powered by a 2 h.p. motor in the 36" model and a 3 h.p. motor in 42" and 52" sizes.

Literature describing the new shear is available upon request. Write:

Acme Equipment Co., Inc., Dept. BB
126 S. Clinton St.
Chicago 6, Ill.

ANTON MACHINE WORKS MOVES LOCATION

Anton Machine Works, Brooklyn manufacturer of the well-known line of Anton Parallels, has recently announced its removal to larger quarters. Its new address, effective immediately is 1226 Flushing Avenue, Brooklyn. The telephone number is HE 3-2911.

• PORTABLE • ELEVATING TABLE



**Saves
TIME
and
LABOR**

• Eliminate heavy lifting and cut handling costs. Slight foot pressure varies height up to 15 $\frac{1}{2}$ ", leaving operator's hands free. Table swivels and locks in any position.

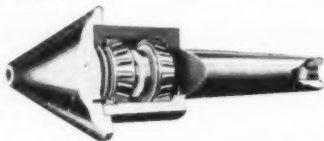
• **SEND TODAY FOR ILLUSTRATED
CATALOG NO. 2**

• **MIDWEST TOOL & ENG. CO.**
• **112 WEBSTER ST., DAYTON, OHIO**

HOLUB LIVE CENTERS STRESS HIGH ACCURACY AND RIGIDITY

A new live center which is stated by its manufacturer to be capable of handling heavier loads at higher speeds, has recently been introduced by Holub Industries, Inc. The new device is offered in two series, the standard male point type, and the pipe type. The first is available in five, and the latter in four sizes, to fit various Morse tapered shank centers.

The Holub Live Centers are equipped with two rugged, matched Timken bearings which allow the tailstock center point to rotate with the work and still retain absolute concentricity and rigidity. An adjustment retainer ring for preloaded rigidity and bearing wear is also standard equipment. The head of the male point series is made of special alloy steel, of C-64 Rockwell hardness, with a guaranteed maximum runout of .0002". A heavy duty grease seal retains the lubricant and prevents the entrance of metal or dirt in the tool. The shank is made of special hardened steel, precision ground and wear resistant. A grease port for $\frac{1}{8}$ " pipe thread, to receive a standard fitting is supplied.



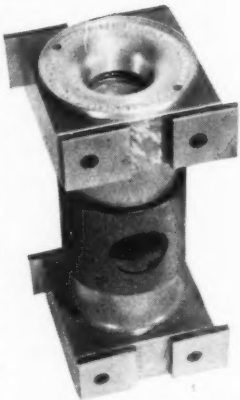
The Holub Pipe Center type, illustrated was developed to support pipe, tubing, hollow forgings and castings during subsequent machining and grinding operations. The same construction and spindle accuracy prevails in this series as in the standard line, the manufacturers state. The Nos. 2 and 3 Morse tapered shank

centers will handle hollow work up to $2\frac{1}{4}$ " i.d. The Nos. 4 and 5 Morse tapered shank centers will take work up to $3\frac{1}{8}$ " i.d. For complete specifications on these useful tools, write:

Holub Industries, Inc., Dept. BB
Sycamore, Ill.

FELL PRECISION PLUMB LEVEL

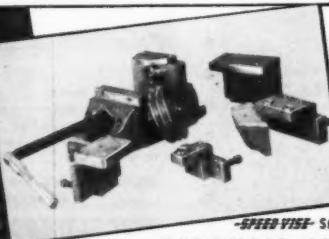
Here is an optical measuring device which serves a dual purpose, since two precision level glasses are incorporated in its design, one for horizontal leveling, and one for vertical or plumb. The Fell Plumb Level is for use on machines with both horizontal and vertical surfaces which must be held square to close limits.



The movable corner plates fit against the 90° corner of a vertical surface. Special plates can be furnished to fit other angles. The horizontal surface or bed of a machine must first be leveled. The Plumb Level is then held by the knurled insulating handle against the vertical ways of the machine being leveled. An error of only one or two tenths of a thousandth of an inch will be revealed, depending upon the accuracy of the surface being checked.

The glasses of the Plumb Level are $2\frac{3}{4}$ " in diameter, and $\frac{1}{2}$ " thick; they are graduated in .0005" per foot spaces both ways.

**A
HUNDRED
JIGS
IN
ONE**



CARDINAL -SPEED VISE-

• EXCLUSIVE FEATURES

1. Saves time — one hand operation — "lift, slide, lock!"
2. Saves tooling expense — smaller, simpler jigs.
3. Saves space in tool crib.
4. Indispensable for toolroom work in addition to production.

NEW LITERATURE AVAILABLE

-SPEED VISE- Stocked by leading Distributors

CARDINAL MACHINE COMPANY

GLENDAL, CALIFORNIA

This permits a rapid, accurate method of squaring the vertical planes of a machine tool with the horizontal parts, as well as indicating the precise amount of lean in any direction. Bubble readings are self-checking by turning the tool half-way around. The bubble, 1-5/16" in diameter, floats in ethyl ether, and is very sensitive to the slightest change in the level; it comes to rest perfectly without washing from side to side.

For complete specifications, write the manufacturer:

Wm. B. Fell Co., Dept. BB
320 McLain Ave.
Rockford, Ill.

NEW BLOWER UNIT SUPPLIES HEATED AIR AT HIGH VELOCITY

A blower type unit heater which features a squirrel cage fan has been added to its line of Pittsburgh gas unit heaters by Automatic Gas Equipment Company. Known as the Pittsburgh Blower Unit, Series "CB", the new heater is designed for installations which require heated air at greater velocities and against greater static pressure than provided by standard unit heaters equipped with conventional propeller type fans. The unit is supplied

in five sizes, with AGA output as follows: 172,000; 136,000; 112,000; 84,000; and 68,000 BTU per hour.

The Pittsburgh Blower Unit, Series "CB", is the same basic unit as standard

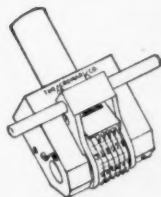


Pittsburgh gas unit heaters. It is equipped with cast iron heat exchanger and combustion chamber to withstand the corrosive effects of burning gases. The combustion chamber and heat exchanger are

COUNT and NUMBER

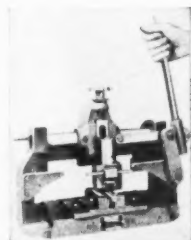
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ACROMARK NUMBERING HEADS.



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USE IN HAND OR POWER MARKING MACHINES OR IN YOUR OWN PUNCH PRESSES.

The
ACROMARK
Company

15 MORRELL STREET ELIZABETH 4, N. J.
"THE ORIGINAL MARKING SPECIALISTS"

cast in one piece, and the extended heating surface fins on the heat exchanger are cast integral. A built-in draft hood absorbs all excessive chimney action and thereby conserves heat.

Descriptive literature will be mailed by the manufacturer upon request.

Automatic Gas Equipment Co.
301 Brushton Ave., Dept. BB
Pittsburgh 21, Pa.

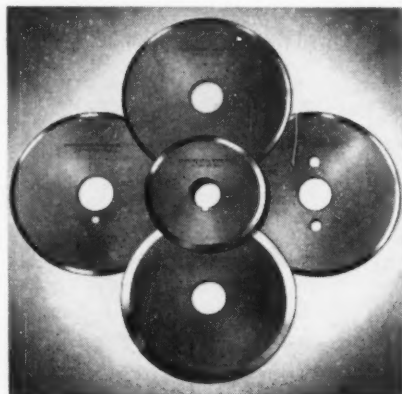
ROTARY PIPE AND TUBE CUT-OFF WHEELS

The Continental Machine Company announces its increased facilities for manufacturing cut-off wheels for rotary pipe and tube cut-off machines.

After years of experimenting with all types of steel, the new Continental cut-off wheel has proven its value. Thousands of these wheels have been satisfactorily used by leading manufacturers. Increased production and more cuts without regrinding are reported constantly, because each wheel is properly hardened, drawn, ground and tested.

The Continental Cut-Off Wheels are available for all makes of cut-off machines. Discs in 7" dia., 3/16" and 1/8"

thick are carried in stock. They can be furnished with 1-7/16", 1 1/2" and 1 3/4" bore. Special size wheels can be made to spe-



cifications in short time. Write for complete information to:

Continental Machine Co.
1960 Maud Ave., Dept. BB
Chicago 14, Ill.

"The STANDARD of COMPARISON for QUALITY and ACCURACY"



American

DRILL JIG BUSHINGS



**IMMEDIATE
DELIVERY!**

Yes, first for quality—American Drill Bushings, precision made from finest oil hardened tool steel, wear longer and give maximum jig drilling accuracy. Concentric ground lead insures perfect alignment, speed and safety. Complete stocks maintained at all times by exclusive distributors throughout the U.S. and Canada for immediate free delivery.

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WITH AUTOMATIC ROLL FEEDS**



- Easily attached to any press.
 - Completely automatic in operation.
 - Presses produce 100% of operating time.
 - Precision built for consistent and accurate feeding and long life.
 - Simple design—easy to maintain.
- Standard models from 3" to 12" wide with up to 18" advance in both single and double feed models. Larger feeds and longer advances can be made to your specifications.

We also manufacture a complete line of Stock Reels Stock Straighteners, Wire Straighteners and Scrap Cutters.

Write today for literature and quotation forms.

La Bahn Machinery and Mfg. Company, Lincoln Highway, Metuchen, N. J.

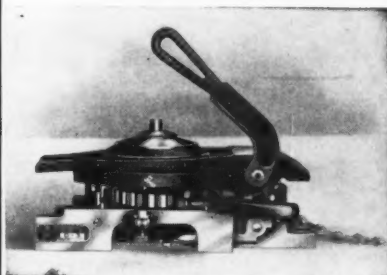
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LA BAHN

MACHINE & MFG. CO.

METUCHEN • NEW JERSEY

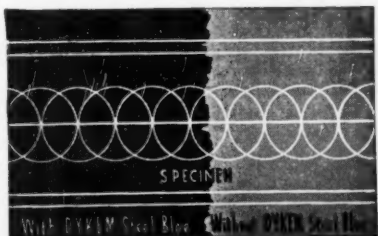
**AUTOMATIC
CHUCKING AND INDEXING
FIXTURE**



- 1.—1800 light cuts per hour.
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 - 3.—Collets changed instantly.
 - 4.—Automatically knocks piece out.
- Model D—Ratchet indexing only—1" cap.
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—Capacity up to 1".
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—Capacity up to 2 1/4".

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**DYKEM STEEL BLUE
STOPS LOSSES
making dies & templates**

Simply brush on, right at the bench; ready for the layout in a few minutes. The dark blue background makes the scribed layout lines show up in sharp relief, and at the same time prevents metal glare. Increases efficiency and accuracy.

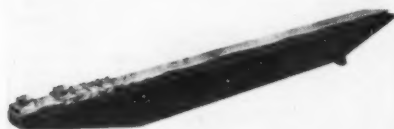
Write for full information.

THE DYKEM COMPANY

2301G North 11th St., St. Louis, Mo.
In Canada: 2486 Dundas St. West, Toronto, Ont.

SCHERR EXTERNAL AND INTERNAL MEASURING MACHINE

The George Scherr Company, Inc. announces a new measuring machine for external and internal measurements which is adaptable for use as a master check and for determining extremely accurate dimensions on pin gages, standard bars, and end measuring rods. The measurements are obtained between hardened steel anvils and flat jaws which may be substituted for round plugs if desired.



For use in both systems, the precision steel scale is graduated in inches and in millimeters. The machine comes in two sizes, No. 1 with a measuring range of 80" and No. 2 with a range of 120". The

slide carrying the vernier and measuring anvils is accurately fitted and a fine adjustment screw is provided. The vernier is of the easy reading Chesterman type, 2.450" long, a considerable improvement over the conventional vernier of only $\frac{5}{8}$ ". With this large vernier, readings may be made quickly and accurately without the use of magnifiers.

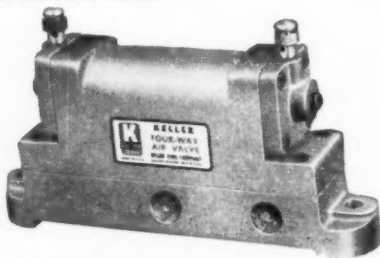
The width of the machine is 8" and the height 10 $\frac{1}{2}$ ", while the length is 8 feet for model No. 1 and 11 feet for model No. 2. The machine is substantially built, weighing approximately 300 and 400 lbs., respectively. Complete information may be obtained from:

George Scherr Co., Dept. BB
198 Lafayette St.
New York 12, N. Y.

NEW KELLER 4-WAY VALVES

A new line of four-way air valves, of the balanced-piston type has been introduced by the Keller Tool Co. The valves are designed to control double-acting air cylinders in Keller Airfeeddrills, and are for use with other air tools or fixtures requiring fast, accurate control.

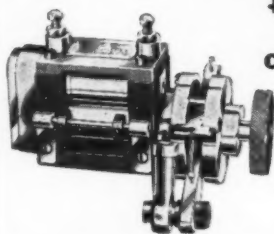
The valve is actuated by poppet-type control buttons, which exhaust the air from either end of a balanced piston. The piston is used only as a means of operating a faced slide valve, which is the actual seal for directional control of the flow of air.



The design features of the valve include a slide valve of molded, oil-resistant rubber, and a stainless steel, rust-resistant piston for moving the slide valve. Packing and lapped fits have been eliminated in order to lengthen the unit's service life. All pipe connections are located in the base so that working parts are accessible without disconnecting the air lines.

The new four-way air valves are available with $\frac{1}{4}$ ", $\frac{1}{2}$ " and 1" pipe threads, with air capacities of 30, 90, and 350 cubic feet per minute, respectively. They

A Most Versatile ROLL FEED for



A PRECISION ROLLFEED with Semi-Steel Castings, Hardened and Ground Rolls and Friction Discs. Other sizes priced proportionately low.

Write for Circular

ROLL FEEDS CORP.

148 Middle St. Pawtucket, R. I.

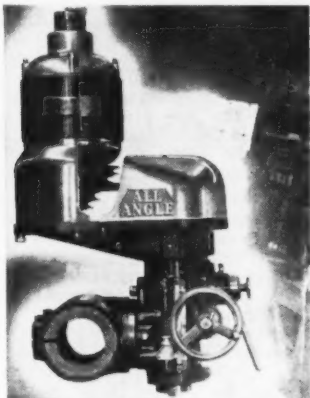
~~\$99.50~~
\$89.50
Net
Complete

can be bench mounted or mounted as an integral part of a fixture, with remote control of operation. For complete data, write:

Keller Tool Co., Dept. BB
Grand Haven, Mich.

FRAY HEAVY-DUTY MILLING ATTACHMENT

Production of their new Type 4 milling attachment is announced by the Fray Machine Tool Company. This unit is claimed to be largest head of its kind on the market. It is precision built for use on the most intricate metalworking jobs. A 1½ h.p. motor supplies power for precision high-speed carbide cutting, and the attachment's flexibility permits work at different angles without changing the work set-up.



The unit is equipped with precision No. 5 bearings having 30 milling machine taper. A positive direct drive and planetary back gear giving 3:1 reduction is provided through an involute 14-tooth spline drive, which transmits uniform power without side-pull. Kinking of the spindle between bearings is eliminated by the short draw-bolt. This combination permits extremely close tolerances.

The Fray Type 4 milling attachment features hardened heat-treated alloys in all driving parts and is built as a heavy-duty precision tool, useful for milling, drilling, boring and grinding operations. Adaptors are provided to permit its use on various types of milling machines, planers, lathes, etc. For complete information, write:

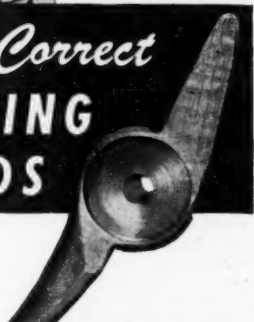
Fray Machine Tool Co., Dept. BB
Glendale, Calif.

KLEIN



CUTS COSTS

with Correct
CUTTING FLUIDS



MATHIAS KLEIN & SONS, Chicago, selected cutting fluids for machining high carbon vanadium steel plier forgings by competitive tests. With D. A. Stuart's Solvol, tool life was *more than double that secured with the best of several products tested.*

A 20 to 1 dilution of Solvol permits side broaching 28,000 pieces per grind. Drilling, reaming and countersinking production is 650 pieces per hour with a 30 to 1 dilution.

The results secured with Solvol show why in buying cutting fluids it is *wise economy* to figure production costs rather than cutting fluid price. Write for booklet.

STUART *service goes with every barrel*



D. A. Stuart Oil Co.
EST. 1895 LIMITED

2739½ South Troy Street, Chicago 23, Ill.

BRUNING WHITEPRINTER HAS OUTPUT OF 105 SQ. FT. PER MINUTE

A new Whiteprinter is announced by the Charles Bruning Co. for use in engineering and business offices with a large volume of duplicating work. This machine reproduces anything drawn, typed, written, or printed upon translucent mediums, at speeds up to 105 square feet per minute. Prints from post card size up to 42" wide and any length are made with equal ease.

This new device is called the Volumatic Model 93. It produces direct positive prints (black lines on white or tinted stocks) directly from the original drawing or document without intermediate steps. BW prints are exact copies of the original.

No special training is needed to operate the Volumatic, since the operator simply feeds the material to be duplicated into the machine. The process is completely automatic. BW prints are delivered in a few seconds—stacked, flat and dry, ready for immediate use. The BW Process is odorless. The Volumatic can be operated anywhere in the plant or office without ventilating ducts. The finished BW prints can be safely filed with other types of prints without fear of bleaching.

The new unit provides a built-in constant voltage transformer as standard equipment. It compensates for fluctuations between 190 and 250 volts in the public power lines, and keeps the speed of the motors and the rated output of the lamp constant.

A sheet separating device returns the original to the operator, while forward-



ing the print through the developing unit of the machine. Another feature provides uniform development of prints, regardless of the speed setting. The exposed print is fed automatically between developer rolls which apply developer solution to both sides of the paper simultaneously.

The Volumatic requires no plumbing connections, ventilating ducts nor dark-room. It is self-contained and portable. For full information, write for Bulletin No. A-1053, available upon request to:

Charles Bruning Co., Dept. BB
4754 W. Montrose Ave.
Chicago 41, Ill.

NEW WEBBER GAGE BLOCK IS INSULATED FROM BODY HEAT

Webber's new Thermo-Guard Gage Block features two unusual advantages to tool makers. It is claimed to lower the cost of carbide blocks, and it increases

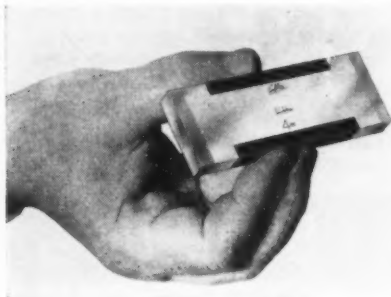
the precision of steel blocks, according to the manufacturer.

It has heretofore been necessary to allow blocks to "cool off" after handling, and before making a critical inspection. The heat transmitted from the hands can cause an ordinary 4" steel block to grow .00005" in 15 seconds. To overcome this expansion, Thermo-Guards are inlaid in all 2", 3" and 4" steel and carbide blocks, completely insulating the block from the heat of the hand.

This new development should interest tool makers who must work in split tenths and in dimensions above 1".

For complete details, write the manufacturers:

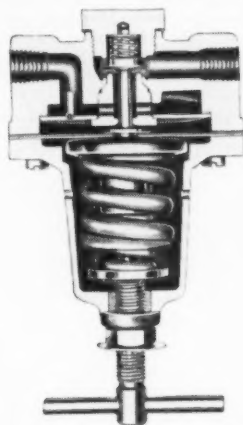
The Webber Gage Co., Dept. BB
12900 Triskett Road
Cleveland 11, Ohio



NORGREN PRESSURE REGULATOR

Positive protection against "creep" is one of the many proven features of a new relieving-type Pressure Regulator produced by the C. A. Norgren Co.

This regulator is suited for use on lines carrying air or non-corrosive gases and such fluids as oil, cold water, etc.—for line pressures up to 400 p.s.i. and working pressures up to 250 p.s.i. Its performance is said to exceed that of regulators having larger diaphragms and valve ports.



The relief valve action is simple and positive. The lower spring rest, containing the valve opening, pivots on a ball-end valve pin. Relief valve permits downward adjustment of pressure without "bleeding" the line and is an extra safeguard against damage to parts due to pressure surges.

A baffle-plate-with-syphon-tube feature permits greater air flow with less pressure drop. Lower spring rest automatically adjusts itself to any eccentricity. Parts subjected to wear are hard chromed for longer service.

The unit is easily installed—straight through pipe connections. It can be disassembled, if necessary, without removing it from the line, with only a crescent wrench and screwdriver. The regulator is for pipe sizes from 1/4" to 1". For complete details, write:

C. A. Norgren Co., Dept. BB
222 Santa Fe Drive
Denver 9, Colo.

DID YOU KNOW? The Hager

UNIVERSAL CARBIDE GRINDER

with the Patented

RECIPROCATING
ACTION

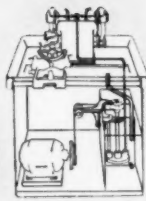
GRINDS WET...

It has a pump that supplies coolant in liberal quantity to prevent overheating while rapidly removing stock. Carbide tip won't crack while grinding!



Write
for
details!

HAGER



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LUMA Soldering Tool



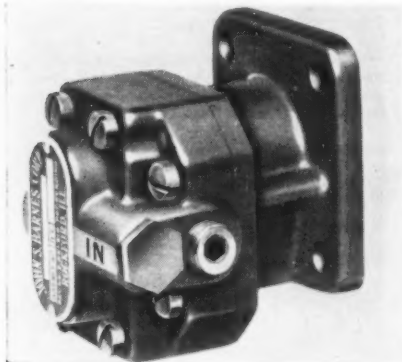
RESISTANCE TYPE

A proven tool for all soldering jobs large or small. Heats instantly—low maintenance. Safe to operate. Write for details.

LUMA ELECTRIC EQUIPMENT CO.
P. O. Box 132-H TOLEDO 1, OHIO

BARNES HIGH-PRESSURE GEAR PUMP

Designed particularly for use on power units, truck applications, and materials handling equipment, the John S. Barnes Corporation has announced the addition of a line of high pressure pumps to its line of Constant-Flo Rotary Gear Pumps.



This new line of high pressure gear pumps maintains continuous pressure up to 1000 p.s.i., and intermittent pressure up to 1500 p.s.i. The pumps throughout maintain the same mounting dimensions as the standard low pressure models.

These new high pressure pumps stress two unique features: the pumps embody an anti-friction bearing design; the mechanical and volumetric efficiency are extremely high. Catalog sheets giving complete engineering data will be sent upon request. Write:

John S. Barnes Corp., Dept. BB
145 Walnut St.
Rockford, Ill.

TIMECUTTER, THE NEW LAPPING COMPOUND

Repeated tests conducted by the Timesaver Products Co. have caused the manufacturer to claim that Timecutter, its new, three-way improved lapping compound cuts hardened steel twice as fast as ordinary compounds.

The secret is in the vehicle that carries the silicon carbide. The oil base holds the abrasive grains at the points of contact where they actually grind, rather than roll or wash away. Furthermore, the compound washes off in a sludge carrying away the silicon carbide cleanly and thoroughly.

Timecutter is packed in ten different grits ranging from very coarse to micro-

scopic fine. This new product should find many users among all manufacturers of metal products from heavy machinery to delicate instruments. Full information may be obtained by writing:

Timesaver Products Co., Dept. BB
546 W. Washington Blvd.
Chicago 6, Ill.

OHIO SPOTWELD NUTS AND SPOTWELD SCREWS

The recognition of the necessity of using all possible methods of bringing down costs of manufacturing on all sorts of domestic, office and industrial appliances has focused the attention of industrial management on the reduction of fastening costs by the usage of resistance welding equipment.

As makers of fasteners and fittings for attaching to sheet steel surfaces by using projection welding, The Ohio Nut & Bolt Company has received repeated requests to make a line of fasteners and fittings that could be attached by the spot welding method, used in many instances to "tack" the fastener or fitting in place on products where the design throws no particular stress or load upon the welded joint.

Seven sizes of Spotweld Nuts ranging from No. 8-32 up to and including 5/16-18 threaded hole are now being manufactured on a production basis. Sixty-three production sizes of Spotweld Screws are also carried in stock for prompt shipment of production quantities.



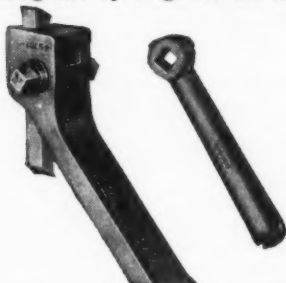
Stock sizes of Spotweld Nuts and production sizes of Spotweld Screws are designed for use with the commercial thicknesses of sheet steel. Spotweld Nuts are made of low carbon steel, specially made to give highest welding quality; the Spotweld Screws are made either of low carbon steel, high brass or stainless steel.

The savings obtained by using these new products are said to run, in many cases, five times the selling price of the product replacing parts now being arc welded or brazed in position. Write for Bulletin No. 493, containing detailed information about dimensions and types in which these products are available.

The Ohio Nut & Bolt Co.
600 Front St., Dept. BB
Berea, Ohio

PRECISION TOOL HOLDER HAS WIDE APPLICATION

An ingenious precision tool holder has recently been introduced by Elk Tools, Inc. This useful device handles a great variety of lathe operations, as well as planers, shapers, and special machinery. It is basically a simple tool, consisting solely of an alloy-steel, drop forged, heat treated body which terminates in a head containing two openings for the tool bit



which run parallel to the center line of the holder; a positive locking device provides for locking in either right or left hand position.

The Elk "Universal" precision tool holder is stated by its manufacturer to be able

to perform the work of ten different tool holders with great convenience and flexibility. Its camming mechanism, or locking device, is provided with a square head on both ends of the cam, in order to avoid clogging with chips and interference with locking.

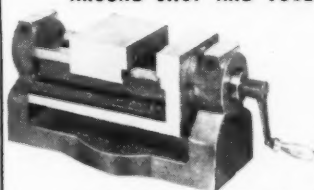
An important feature of the device is the constant parallelism of the tool bit and the holder; it can be moved in the holder without changing its position in relation to the work. Thus, once the holder is set up, the bit can be removed for grinding and replaced without resetting the holder in the tool post. Due to the horizontal position of the bit, only a small clearance angle at the cutting edge is required. This prevents tool breakage, and is one of the reasons why carbide tool bits can be used to good advantage in the Elk holder.

A Super X Tool Bit and square box wrench are furnished as standard equipment. The Elk holder is supplied in four sizes, ranging in bit sizes from $\frac{1}{4}$ "x $2\frac{1}{4}$ " to $7/16$ "x $3\frac{1}{2}$ ". Write for complete details to: Elk Tools, Inc., Dept. BB, 71 West Broadway, New York 7, N.Y.

INTRODUCING THE NEW

TRUNION VISE AND ANGLE PLATE

A STURDY TOOL WITH MANY USES AROUND SHOP AND TOOL ROOM



Here's a Vise PLUS an angle plate . . . to make it the most versatile tool in your plant. Trunion mounted $5 \times 5 \times 1\frac{1}{4}$ " vise backed by 5×10 " surface plate with 2- $\frac{3}{8}$ " Tee slots which can be rotated 360°!! Can be clamped at any angle to accommodate index and angle work on milling machines, grinders or drill presses. If work can not be clamped in vise, merely bolt it to the tee slotted plate. Write today for full details and prices.

CONRAD MACHINE CO.

State Rt. No. 53 & Hoy Rd., Lombard, Ill.

Here's "Know-How" at your Fingertips!

PRODUCTION HANDBOOK

L.P. Alford & J.R. Bangs, Editors—with Board of 90



PACKED with production management methods used with success by outstanding concerns. New developments and latest applications of established principles of management. Usable in any type or size plant. 25 SECTIONS: Plant organization, production planning, time study, operation analysis, motion study, quality control, plant layout, machinery, materials handling, job evaluation, wage plans, etc. Flexible binding. 1676 pages. \$7.50

SENT ON 5 DAYS' APPROVAL

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Send me Production Handbook, \$7.50. I will remit or return book in 5 days.

Name

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Address

City..... State.....

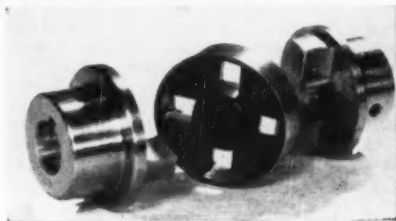
THE RONALD PRESS COMPANY

15 East 26th Street, New York 10, N. Y.

ARTICULATED FLEXIBLE COUPLING COMPENSATES FOR MISALIGNMENT

A new, articulated, flexible coupling is announced by the Estey Company. It is stated to be able to carry heavy loads under severe operating conditions without thrust on the driver or driven, and without distortion, back lash, or chatter.

The extra large synthetic-rubber spider (which withstands high temperatures and is completely oil-resistant) provides high shock absorption and will resist higher torque. The steel retaining ring, molded and bonded to the synthetic rubber spider, prevents distortion and rapidly dissipates heat generated by misalignment. The steel spider ring also allows the coupling to operate at high speed without damage or breakdown of the synthetic rubber spider from torque and centrifugal force. The driving lugs, milled from steel bars, with concave surfaces fit into the convex surfaced cavities of the spider and tend to compress the syn-



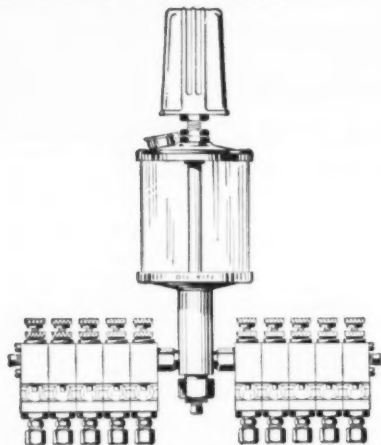
thetic rubber, thus minimizing vibration.

This simple, three piece coupling compensates for both parallel and angular misalignment, needs no lubrication and runs silently. Write for complete specifications to:

Estey Company, Dept. BB
547 North Main St.
Canandaigua, N. Y.

SOLENOID OPERATED, SINGLE OR MULTIPLE FEED OILER

Oil-Rite's latest addition to their line of lubricating devices is an Electro-Oiler which is entirely automatic in operation. Oil is released from the reservoir by a solenoid operated valve through single or multiple sight feed valves to the individual bearings to be lubricated.



The solenoid is connected across the line of the driving motor of the machine, the bearings of which are to be lubricated. When the motor switch is turned on, lubrication of the bearings starts immediately. There is no toggle to be

turned on or off, and the single reservoir will feed up to 24 bearings, thus replacing many individual oilers. The oil fed to each bearing can be conveniently and individually adjusted. Hair-line adjustments on each feed valve can be made through the use of a friction screw. The amount of friction can be varied by tightening or loosening the knurled lock nut, depending upon individual conditions. The screw can be locked against severe vibration. The device is suitable to a wide variety of machine tools, punch presses, printing presses, conveyors, etc.

A solenoid has been selected which is dependable, trouble free and long lasting. It can be operated continuously without overheating, and is mounted in a manner to make wiring easy.

Otherwise the construction of the oiler resembles the manufacturer's Style DM Multiple Oiler with light weight aluminum alloy body, Lucite or glass reservoirs, self-closing hinge lids, central mounting shank, a compact gang of sight feed valves on two sides of the shank, and compression fittings for $\frac{1}{4}$ " or $\frac{5}{16}$ " o.d. tubing.

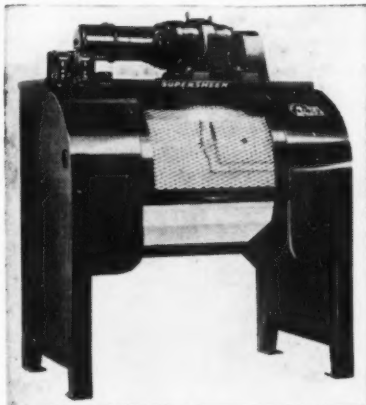
Standard models are available in five body sizes with capacities from 9 ounces to 1 gallon, up to 24 feeds, for standard voltages and frequencies.

Complete information will be supplied upon request to:

Oil-Rite Corporation, Dept. BB
3474 South 13th St.
Milwaukee 7, Wis.

DEBURRING AND FINISHING BARREL

The manufacturers of Almco "Supersheen" Deburring and Finishing Equipment announce their new deburring and finishing barrel, Model DB-200. The new unit is said to offer greater versatility, maximum safety, and maximum ease of operation. The manufacturer reports that before putting this model into regular production, it was thoroughly tested on a wide variety of deburring and finishing work.



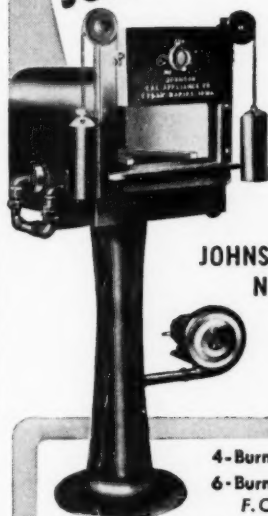
The barrel speed is variable at a rate of from 6 to 30 r.p.m., providing the exact rate for each specific job. Maximum safety is assured with a rollaway perforated hood, which permits positioning of barrel with the hood down. There are no protruding parts or door handles.

Ease of operation is assured with a positive magnetic break that allows inching the barrel into position. Doors are cam-operated for quicker opening and quicker closing. Two safety switches are provided—both forward and reversing. This new model DB-200 is available either with Neoprene lining, or unlined.

Almco maintains a network of free Engineering Clinics for sample processing. Each of these Clinics duplicate actual shop conditions and have proven to be the authentic source of complete data on production costs and procedure. Descriptive literature on the new unit, and the address of the nearest Supersheen Engineering Clinic can be had from:

Almco Division, Dept. BB
Queen Stove Works, Inc.
Albert Lea, Minn.

**TURN THE HEAT
on HIGH SPEED STEELS
Quick Acting
JOHNSON FURNACES**



**JOHNSON Hi-Speed
No. 130A**

**4-Burner \$295
6-Burner \$325**
F. O. B. Factory

High Uniform Temperatures at LOW COST

Quick Acting JOHNSON No. 130A is available in two temperature ranges. 4-Burner unit is for steels requiring 1400—2350° F., and 6-Burner unit for 1800—2400° F. Powerful, efficient burners fire under hearth assuring fast, uniform heat. Save time and gas. Easily regulated. Firebox 7x13x16½ lined with high temperature insulating refractory. Complete, ready for action with Carbofrax Hearth, G. E. Motor and Johnson Blower. Order Today!

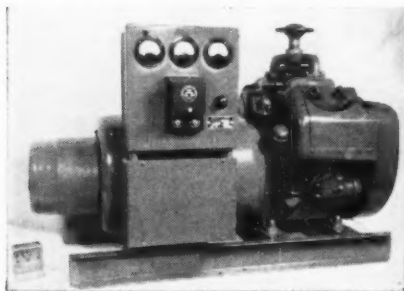
Write for Complete Catalog

Johnson Gas Appliance Co.
570 E Ave. N. W., Cedar Rapids, Ia.

KATOLIGHT STANDBY POWER PLANTS

The Kato Engineering Co. has recently designed a line of Power Plants suitable for standby power and emergency supply of electricity for power and light. These machines are powered with 1, 2, and 4 cylinder, air-cooled engines which make them especially desirable for standby power because there is no radiator and anti-freeze solution to take care of. They, consequently, can be installed in freezing atmospheres. The engines are equipped with high tension magnetos, permitting easy hand cranking which eliminates need for starting batteries. However, all models are available with electrical cranking on specification.

The Generators are large in proportion to rated engine horsepower to facilitate starting single phase a.c. motors which may require as much as five times running current for starting. They are available with or without automatic voltage regulator. When supplied without regulators, Generators are designed to give maximum stability and good voltage regulation on non-inductive loads. However, if several motors must be operated which will cut in and out inadvertently, a voltage regulator is recommended.



The illustration shows the Model 49HAW4, 10 K.W., 110/220 volt, 60 cycle, 1800 r.p.m. a.c. Revolving Field Generator powered with a Wisconsin VP4, 20 h.p. four cylinder, air-cooled engine.

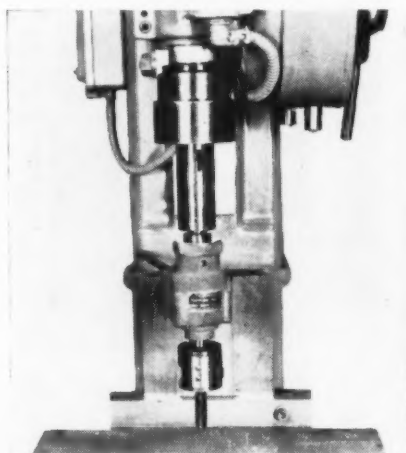
These Standby Plants are designed to run at 1800 r.p.m. They are designed for continuous operation; however, Katolight engineers have always recommended lower speed, 1200 r.p.m., where Plants are to be the only and sole source of electrical supply and if requirement calls for heavy usage. Katolight Generators are built in 1200, 900, and 720 r.p.m., in capacity ranging from 5000 watts to 200 kilowatts at 60 cycle. They are also avail-

able in frequencies ranging from 25 cycles to 400 cycles. These machines are described in other bulletins available upon request. Write:

Kato Engineering Co., Dept. BB
Mankato, Minnesota

DORMAN TAPPING ATTACHMENT FEATURES AUTOMATIC REVERSE

The Dorman Machine Tool Works, tap-per manufacturers for the past forty years, introduce a new high speed, automatic reverse Tapping Attachment, of full ball bearing construction. The new de-



vice is unusually compact, measuring only $3\frac{1}{2}'' \times 5\frac{1}{2}'' \times 9''$, and weighs only 11 lbs. The unit possesses great strength for its size, having a capacity for hand or machine screw taps of from $\frac{3}{8}''$ to $\frac{7}{8}''$, and pipe taps of from $\frac{1}{4}''$ to $\frac{1}{2}''$ in steel.

Due to the unit's light weight and ball bearing construction, it possesses unusual sensitivity in handling. The new Tapping Attachment is provided with a clutch which is built in to hardened drive and reverse gears, and with a full floating chuck jaw to prevent breakage which might occur from the misalignment of tap and hole. The illustration above shows the new Dorman Model 2-B Tapping Attachment being used with a recent model Avey Drill Press. For complete specifications on this new tool, write:

Dorman Machine Tool Works
40 So. MacQuesten Parkway
Mount Vernon, N. Y.

COMPACT GAS-WELDING KIT

A compact welding kit, containing low-temperature alloys and fluxes for any gas welding job, is available from All-State Welding Alloys Company, Inc.. The complete kit comes in a metal box and is known as the All-State Doc Alloys Kit.

This kit, which is "field designed", is useful to welder, distributor and manufacturer alike. It is designed to become standard equipment with every gas welding outfit kept on contract jobs, on ships, and for field repair of every kind as well as for maintenance welders in plants, mines, foundries, etc. To the welder, it gives in a small metal box (2" x 4½" x 20½") a supply of silver solder and 10 other different kinds of low-temperature gas welding rods, a low-temperature galvanizing powder, and 8 fluxes. The rods are individually color marked and in labeled pockets in a leatherette roll; flux jars have individual labels; a booklet of complete instructions is included; and the cover of the box contains a chart of contents with working directions.

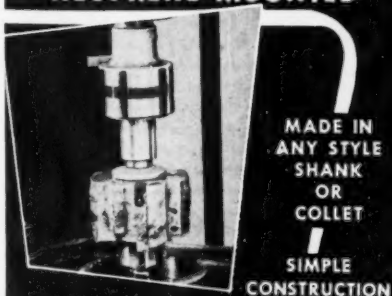


With this kit the welder will have the right alloys and fluxes with him for nearly any type of job he may encounter; the distributor is no longer obliged to break standard packages to sell small amounts for trial purposes; and for manufacturers, the kit serves as a sample of the full line of its low-temperature gas welding rods.

The low-temperature rods eliminate almost completely the need for dismantling, preheating, after-cooling, and re-assembly in the repair of broken parts which the welding operator can reach.

For complete data, write:
All-State Welding Alloys Co.
273 Ferris Ave., Dept. BB
White Plains, N. Y.

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FULL FLOATING
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REDUCES TOOL BREAKAGE
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We also make silent gears of rawhide and Fabrolite.

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Greaves MACHINE TOOL CO.

2013-18 Eastern Ave.
Cincinnati, Ohio

Pictured: a 38-Spindle Heavy-Duty Drill Head.

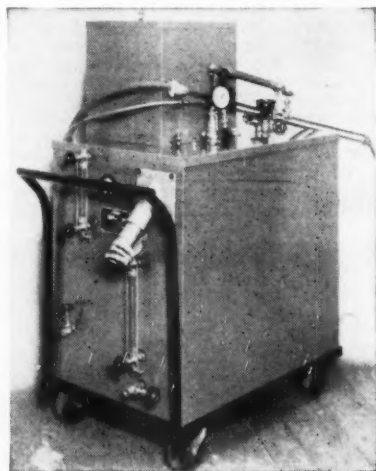
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LIVINGSTON INDUSTRIAL STEAM-JET CLEANER

Livingstone Engineering Company announces its new Speedylelectric JC-30 Steam-Jet Cleaner. The exacting specifications for this unit required a portable fully automatic, maintenance-free and effective steam-detergent cleaning unit that could be operated safely and silently in the factory during working hours without annoyance or discomfort to personnel or damage to nearby machinery, parts and materials.



The Speedylelectric JC-30, using high pressure steam from its built-in boiler, eliminates the excess water problems common to conventional types of "steam" cleaners. The high pressure steam is mixed with the proper amount of detergent at the jet. No excess water dilutes the detergent nor floods the working area. Boiler and jet are under constant fingertip control of the operator. A pressure tank assures positive flow of detergent. High ceilings, tall machines, and large equipment may be steam cleaned without the height limitation usually encountered.

Maintenance problems are minimized, since there are no coils or tubes to scale or burn out; no motors, pumps or moving parts to wear out. Since sparks and fire hazards are eliminated, the Speedylelectric JC-30 can be safely operated in oil re-

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2	3/16	5/8	2.10	4	3/4	1 1/4	6.65
2	1/4	1/2	2.20	4	7/8	1	7.15
2	1/4	5/8	2.20	4	7/8	1 1/4	7.15
2	3/8	1/2	2.40	5	1/2	1	7.55
2	3/8	5/8	2.40	5	1/2	1 1/4	7.55
2 1/2	1/4	7/8	2.70	5	5/8	1	8.35
2 1/2	5/16	7/8	2.85	5	5/8	1 1/4	8.35
2 1/2	3/8	7/8	3.00	5	3/4	1	9.10
2 1/2	1/2	7/8	3.30	5	3/4	1 1/4	9.10
3	1/4	1	3.25	5	1 1/2	1 1/4	10.65
3	5/16	1	3.45	6	1/2	1	9.85
3	3/8	1	3.60	6	1/2	1 1/4	9.85
3	7/16	1	3.80	6	5/8	1 1/4	10.90
4	1/2	1	4.00	6	3/4	1	12.00
4	1/4	1	4.50	6	3/4	1 1/4	12.00
4	3/8	1	5.05	6	1	1 1/4	14.20
4	1/2	1	5.65	7	3/4	1 1/4	17.20
4	1/2	1 1/4	5.65	7	1	1 1/4	20.15
4	5/8	1	6.15	8	3/4	1 1/4	22.85
4	5/8	1 1/4	6.15	8	1	1 1/4	26.70

EASTERN TOOL AND SUPPLY COMPANY
178 GRAND ST., NEW YORK CITY

fineries, paint works, chemical plants, garages etc. The unit weighs about 500 lbs., and is mounted on an all-steel dolly with ball bearing rubber tired swivel casters, thus is easily portable. High pressure steam and detergent hose, nozzle and control are standard equipment. Floor space required is 27" x 40". The unit operates on a.c. current, 220 volts and over, single or polyphase. Boiler has capacity of 30 k.w. is ASME National Board Stamped, Underwriters' Laboratories listing. For complete information, write:

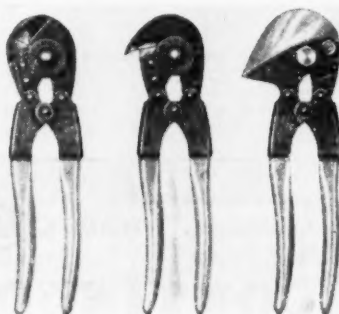
Livingstone Engineering Co., Dept. BB
100 Grove St.,
Worcester 5, Mass.

THREE NEW PORTER "HANDKLIP" TOOLS

A new line of small cutting tools, designated as "HandKlip," has recently been introduced by H. K. Porter, Inc., manufacturers of small tools.

The one illustrated on the right is a shear cutter—cuts steel strapping, wire stay and box wire. In the middle is a wire cutter (for cutting soft wires, rods, and 1/4" bolts) and the one on the left is an angle cutter (for close cutting of cotter pins, rods, bolts, etc.) All three tools

have the same power joint principle, the same pressed steel handles covered with a red plastic which is unaffected by weather or water. These three tools are new in design from tip to tip, powerful and yet light and compact. They are



stated to be able to withstand long hard usage.

For complete descriptive information, write:

H. K. Porter Inc., Dept. BB
Somerville 43, Mass.

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**STANDARD:
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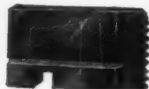
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**24000 Stephenson Hwy
HAZEL PARK, MICH.**

NEW DO ALL SHEAR HAS WIDE USAGE

An improved type of cam and lever-actuated shear that cuts off flat strip stock with punch and die precision is announced by The DoAll Company. The chief use of the new shear is in cutting off bandsaw blade square and flat in



preparation for welding into a band. It will take blade up to .045" thick and 1 1/4" in width. Usually, metal cutting snips are used for this purpose. Their scissor action and inaccuracy due to slippage or

bending, result in deformed ends that are difficult to match up for a successful weld. The welded joint is uneven, since the ends do not butt together properly.

The new DoAll unit has a wider shearing surface and stays sharp longer; it produces a smoother cut than is produced by snips. It can be mounted on the saw or permanently mounted in convenient location on the wall or bench.

The DoAll Shear is an efficient accessory that is useful to the bandsaw operator or for a tool crib that dispenses bandsaw blade which is prepared for immediate welding. The shear will also find many uses wherever smooth, square cut edges are desired. These characteristics are essential for accurate alignment of opposing pieces to be joined by brazing, or by butt or flash welding. The shear's action will appeal to operators engaged in salvaging metal strapping and baling ties, joining wire and coil stock for punch press roll feeds, etc.

The clean quick cutting by the pivoted shear descending between two knife edge blades, as the strip of material is accurately positioned by a squaring plate, eliminates any deformity of material at the cut. A piece of blade 1/8" wide is re-



Plain Type

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CONTINUOUS HINGES

All hinges shown can be furnished with special holes, cutouts and bends to blue-print in metals to suit the job.

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**1110 E. 87TH ST.
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SPECIFICATIONS:
Open Width 1/8" to 6"
Gage Material .040 to .125
Pin Diameter .101 to 3/8"
Lengths to 120"

SEMI-OFFSET

moved so that an old weld can be cut out and at the same time the blade ends are squared in preparation for a new weld. No further grinding is required to square or flatten down turned up ends for welding.

For complete information on this new shear, write:

The DoAll Company
254 N. Laurel Ave.
Des Plaines, Ill.

27-DRAWER OFFICE CABINETS

Cole Steel Equipment Co. offers for immediate delivery, a 27 drawer cabinet. Because of the curtailment of steel, and the immediate adjustment period of the aftermath of the war, cabinets such as these were unobtainable. The cabinet is a valuable unit for locating and safeguarding catalogues, office forms, art work, photographs, cuts, hardware, and expensive tools or dies.

The cabinet, handsomely designed, comes in olive green or Cole gray crinkle finish. The "letter size" cabinet is 30" wide, 37½" high, 13½" deep, and the inside drawer dimensions are 9" wide, 3½" high, 12" deep. A "legal size" cabinet is

also available which is 17½" deep with inside drawer dimensions 9" wide, 3½" high, 16" deep. A lock which will lock all 27 drawers, and partitions which will divide the drawers into smaller compart-



ments are available. Write for complete information to:

Cole Steel Equipment Co., Inc.
285 Madison Ave., Dept. BB
New York 17, N. Y.

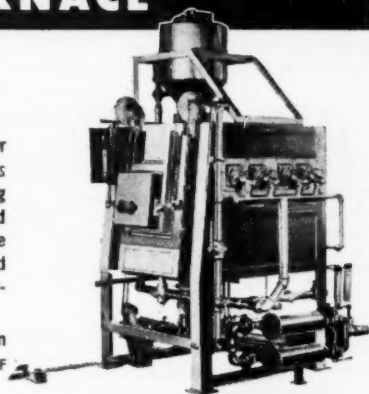
DUAL CHARMO FURNACE

1. GENERAL HEAT TREATING
2. GAS CARBURIZING

This furnace produces its own prepared gas atmosphere for general heat treating. For gas carburizing this atmosphere is enriched and recirculated by a special mechanism. During gas carburizing treatment only a portion of the gas is passed through the recirculating system, thereby preventing the cooling of the entire gas flow. Only about 10% is removed from the muffle at any one time. Twin filter units are incorporated to avoid shut-down for filter cleaning.

This is an ideal furnace for the plant requiring both clean hardening and gas carburizing operations.

2634F



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**Standard Rated
FURNACES**

SURFACE COMBUSTION CORPORATION, TOLEDO 1, OHIO

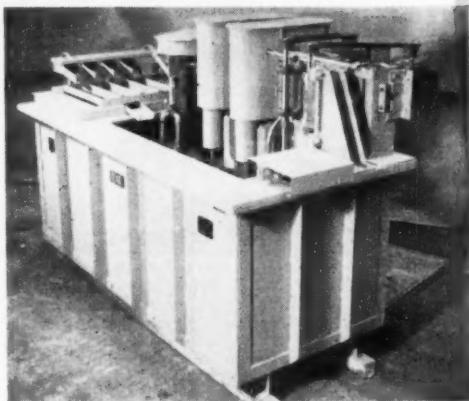
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FULL
DETAILS**

THE NEW AJAX ISOTHERMAL QUENCH FURNACE

Industry's recent widespread adoption of the martempering and austempering heat treating processes has brought about the need for a salt bath quenching furnace that will assure rapid and uniform cooling of the work, and provide a fool-proof method of extracting the high-temperature chloride salts carried over from the austenitizing bath.

The furnace illustrated at the right satisfies the first need by providing a vigorous, upward flow of molten salt in headers, into which the hot work is introduced. The salt is circulated by submerged pumps. A separate pump for each header concentrates a great volume of liquid salt into a confined quenching area. Thus it becomes possible to obtain hardness equal to oil quenching, together with the usual benefits of martempering and austempering, that is, reduced distortion and the elimination of quench cracks.

The second need of removing the chloride contamination is solved by the inclusion of a separate steel tank built into one end of the unit. A motor driven pump lifts the salt from the isothermal quench bath to a trough arranged above the separation tank. This trough is cooled constantly by a blast of air which chills the salt to the optimum separating temperature which is always well below the operating temperature of the quench bath.



The chloride contaminant is precipitated out of solution and collected in wire mesh filter baskets, while the purified nitrate salt—still molten—enters the separation chamber. From there it flows back into the isothermal quench bath, so that the whole cleaning process is on a continuous basis.

Complete specifications and operational details will be supplied by the manufacturer upon request. Write:

Ajax Electric Co., Dept. BB
Delaware Ave. and Laurel St.
Philadelphia 23, Pa.

WILLIAMS NEW CARBON STEEL ADJUSTABLE WRENCHES

J. H. Williams & Co. announces a new line of carbon steel Adjustable Wrenches which are thinner and lighter than conventional carbon steel adjustable wrenches of similar capacity. They have thin, tapered jaws and possess unusual strength and toughness due to an exclusive improvement in design and materials. Made in 4, 6, 8, 10, 12, 15 and 18" sizes with

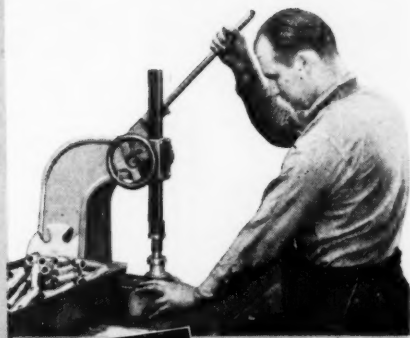
maximum capacities from $\frac{1}{2}$ to 2-1/16", they are drop-forged from selected steel and heat-treated for uniform, dependable strength.

These new carbon steel Adjustable Wrenches are provided with the Williams patented sliding jaw feature. The exclusive design of the square shoulders on the shank portion of the sliding jaw provides maximum bearing against working stress. Wedging and spreading action is eliminated, the manufacturers state.

These tools are fully described in the A-40 Booklet which includes a complete line of other types of carbon steel wrenches manufactured by Williams. Write for a copy to:

J. H. Williams & Co., Dept. BB
400 Vulcan St.
Buffalo 7, N. Y.





THE RIGHT ARBOR PRESS

*-Speeds Production
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AN arbor press is a small production tool, but its correct choice can make a big difference in production costs. Dake arbor presses are available in the most complete range of sizes offered by any manufacturer, and can be provided with hand lever or wheel operation. Pressures available range from 1 ton on up, and every press is designed for minimum maintenance and long life. If you have any production problem where controlled pressure is needed, mail the coupon below for the Dake catalog, or send in details of your problem for our recommendation. There is no obligation.



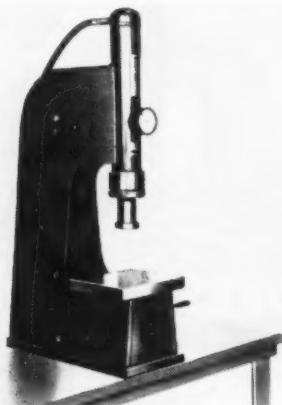
Dake Engine Company
608 Seventh St., Grand Haven, Mich.

Please mail me a copy of the latest Dake
Arbor Press Catalog.

Name _____
Company _____
Address _____
City _____

NEW MOTORIZED HYDRAULIC BENCH PRESS

Munton Manufacturing Co., has introduced a new self-contained, motorized Hydraulic Bench Press, designated type "FM". It is available in 5, 8, 13, and 20-ton capacities.



The new press is equipped with a 3 h.p., 220-440 volt, 3 phase 60 cycle motor, hydraulic pump, valves and piping, all enclosed in the housing of the unit, instead of in a separate floor cabinet. A hand lever actuates and releases the hydraulic ram. A push-button switch on the side of the housing controls the motor-driven hydraulic pump.

The hydraulic ram is mounted on a chromium plated piston which travels in a steel cylinder. Leather back up is provided on seal rings. Valves and reservoir are machined from steel. Motor, pump and valves are readily accessible from rear of housing.

The ram has a 9" stroke; the down-stroke is 100" per minute and return travel 125" per minute on the 5-ton press, slightly less on larger sizes. The height of throat is 10 $\frac{3}{4}$ ". Platen is 10"x16". Overall height of press is 53", width is 14", depth is 40". Specification Sheet "FM" is available on request to:

Munton Mfg. Co., Dept. BB
Franklin Park, Ill.

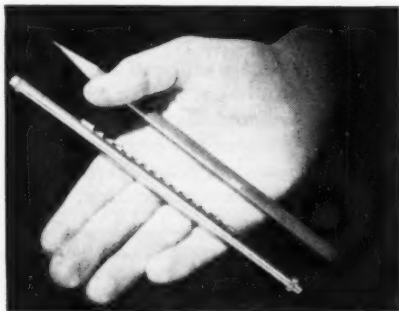
PENCIL-SIZE GLENNY BROACH FOR SMALL KEYWAY JOBS

The Kase Machine Company, manufacturer and new distributor of the Glenny broach, has announced the availability of a small pencil-size broach which is capable of cutting 1/16-inch wide keyways up to .070" in depth. This small precision tool incorporates all of the features which have made the Glenny broach a useful production tool for so many years.

The pencil-size broach features protected blade, simple operation, chatter elimination, absolute centering, maximum adjustability of cutting depth, and rapid keyway cutting, according to The Kase Machine Co. It is made of quality steels; the cutting blade has a Rockwell hardness of 63 to 65 on the C scale, and the precision-ground tool body and nuts are hardened to a Rockwell of 43 to 45 C.

All Glenny broaches incorporate the new standard tooth form which provides a large chip chamber. End nuts facilitate rapid and infinitely variable adjustment for depth of cut. The cutting blade is moved back and forth in a taper-milled slot by means of the end nuts. This action raises and lowers the cutting blade to meet individual job specifications. Once the end nuts have been hand-tightened, the blade is held firmly in position.

Glenny broaches are available in sizes ranging from 5/16" to 1 $\frac{1}{2}$ " in diameter and from 6 $\frac{3}{8}$ " to 11 $\frac{1}{4}$ " in length. Blade widths range from 1/16" to $\frac{1}{2}$ ".



Specification catalog is available upon request to:

The Kase Machine Co.
18428 Buffalo Ave.
Cleveland 19, Ohio

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Here is a new G & H fixture which can be used horizontally or vertically . . . speeds precision machining. 2, 3, 4, 6, 8, 12 and 24 indexes set on

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G & H MFG. CO.

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WAKCO WEIGHT RULE

enables you to calculate almost instantly the weight of a piece of metal in any size or shape. Covers aluminum, brass, cast iron, copper, lead, magnesium and steel, in balls, bars, cubes, fillets, hexagonal, octagonal, plates, prisms, pyramids, 1/4 round, 1/2 round, round, wedges, etc. Rule made with all-white plastic with markings protected by overlamination of clear plastic. RULE in case with Instruction Manual . . . \$13.50

WARREN-KNIGHT CO.

134 1/2 N. 12th St., Phila. 7, Pa.

BURR KEYSEATERS



Mill keyways in the run or on the ends of shafting already erected—save money on alteration, erection, and repair work.

Made in 4 sizes, for hand or motor operation.

Write for Bulletins and prices.

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429 Kent Ave.,

Brooklyn, N. Y.

Save Space and Lifting

Yohe Handy Rack floor stands take less space, hold more stock and require less lifting. Four arm rack - 51" high stacks, 10,000 lbs. Five arm rack 57" high holds 12,000 lbs. flat or round stock — at safe lifting heights. Use against wall or back-to-back in center of room.

Let us send details and prices

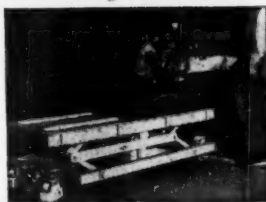
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803 Mahoning Rd., N.E. Canton, Ohio



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New **NESTING TYPE
TOTE PANS**

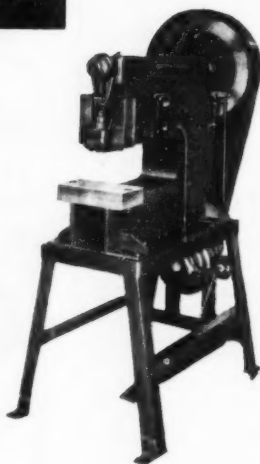
20" Long x 12"
Wide x 6 1/4" Deep
16 Ga., drag holes,
handles both ends.

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BRIDGEPORT 5, CONN.

WHITNEY-JENSEN PRODUCTS
38 YEARS EXPERIENCE

**Nos. 129-130
Deep Throat
POWER
PUNCH PRESSES**

**Capacity — 10 tons
Throat Height — 8"
Stroke Adjustment
— 1 $\frac{3}{4}$ "
12" and 18"
THROAT DEPTHS**



**NO. 5 JR.
HAND PUNCH**

**Capacity — $\frac{1}{4}$ "
thru 16 ga.
Weight — 2 $\frac{3}{4}$ lbs.
Furnished with 7
Punches & Dies**



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Catalog 16-49**

WHITNEY METAL TOOL COMPANY
118 FORBES ST. • ROCKFORD, ILL.

**TEXAS GAS TRANSMISSION BUILDS
800-MILE PIPE LINE**

Increasing quantities of natural gas will be moving toward millions of the nation's consumers next winter.

Texas Gas Transmission Corporation, Owensboro, Kentucky, received final approval early in April from the Federal Power Commission in Washington to build and operate a 26-inch natural gas pipe line that will stretch over 800 miles from the fields of Texas and Louisiana, through the Mississippi and Ohio River valleys to a connection with the Big Inch pipe line system of

Texas Eastern Transmission Corporation near Middletown, Ohio.

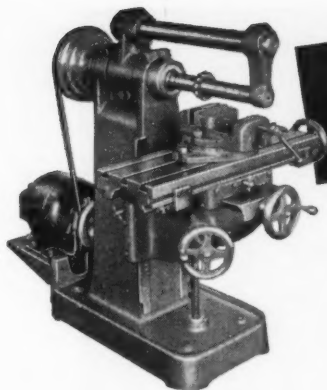
Consumers as far north and east as Syracuse, N. Y. will receive more gas as a result of this project. Plans call for the construction of a \$73,500,000 line that will be in operation later this year and will add approximately 400 million cubic feet of gas daily in the present pipe line capacity of Texas Gas.

The 800-mile line will supplement the Company's existing pipe line system of 1600 miles that serves consumers in Louisiana, Mississippi, Arkansas, Tennessee, Kentucky, Indiana and Illinois. Completion of the project, with its added 68,000 compressor station horsepower will make Texas Gas one of the large pipe line companies in the United States.

The vast quantities of materials and supplies needed to build the line have been pur-

chased, and actual deliveries of steel pipe, compressor station equipment, paints, enamels and other items have been under way during the past several months, while the Company awaited FPC approval.

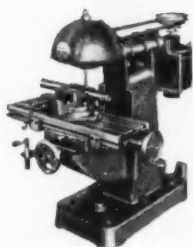
Sixty-three miles of the line south of Memphis have been completed and are now in operation. Construction crews, who will simultaneously work eight "spreads" along the 800-mile route, stand ready to begin operations. The men behind the nation's fastest growing source of fuel and energy—natural gas—will begin forging additional links in the chain of 250,000 miles of underground steel pipe lines that carry gas across the continent.



BENCHMASTER pays off 5 ways!

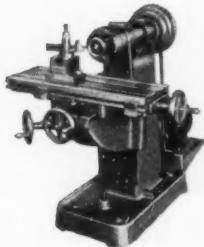
Where else can you find a low cost tool with so many cost-cutting possibilities?

1 FOR HORIZONTAL MILLING quill and overarm slip quickly and snugly in place. Timken Tapered Roller Bearings provide a rigid spindle support at high speeds as well as low. No. 2 Morse Taper. 12½" horizontal table travel with a big 6" x 18" table area.



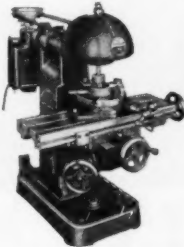
2 WANT A VERTICAL MILLER?

The same machine is quickly converted by substituting this special head. Again Timken Tapered Roller Bearings give smooth, chatter-free performance over a wide speed range. Accessories available: Full line of Benchmaster collets and drawbar; swivel-base vise.



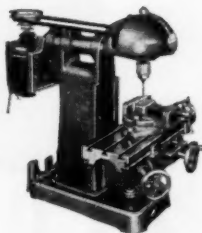
3 WHEN IS A MILL NOT A MILL?

Here's a handy kink to obtain extra *lathe* facilities for facing, turning, forming, etc. Benchmaster Accessories required: Tapered Adapter and Tool Block. By lowering knee position and raising tool you can swing up to 23". Exceptional capacity!



4 QUICK CHANGE ARTIST

Here's the Benchmaster converted to a grinder! Free-rolling bearings maintain high spindle speeds without overheating or risking bearing injury. Grinds internally, surfaces, sharpens cutters, etc. Note Benchmaster 6" Rotary Table—a fine accessory.



5 AND NOW IT'S A DRILL PRESS

The No. 2 Morse Taper in spindle accepts standard Jacobs Chuck Shank. Raising table feeds work into drill. With this setup, drilling layouts is easy—simply measure off correct hole spacing with the lead screws.

- ★ For Precision
- ★ For Quality
- ★ For Value

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BENCHMASTER!*

NOTE: BENCHMASTERS are also available with rack and pinion feed. For production work this provides exceptionally fast operation.

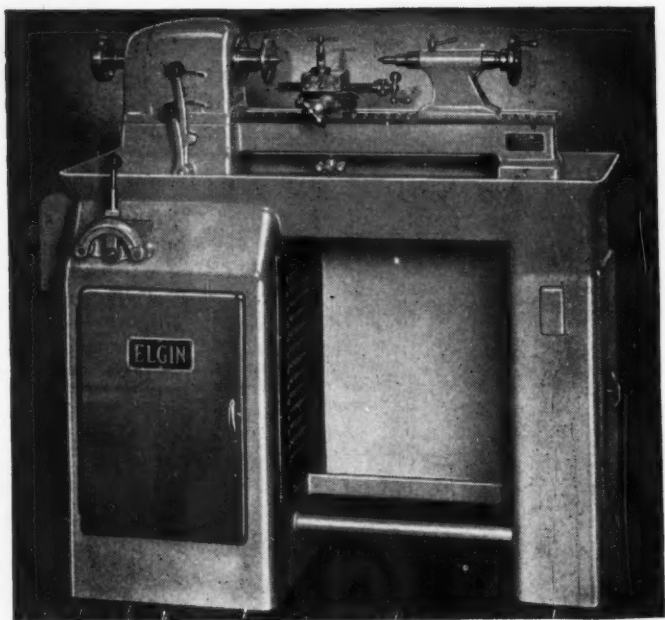
BENCHMASTERS are accurately built with all the care and precision of larger, more expensive tools . . . yet may be purchased for a fraction of big machine cost! Get our circulars on all BENCHMASTER EQUIPMENT!

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Now Provides Operator Comfort

- The "Elgin Line" now is furnished with knee-hole bases with foot rests, permitting operator to sit comfortably, close-up and directly in front of work.
- Motor is mounted in base with direct cross ventilation.
- Three shelves are provided on right hand side.
- Collet board is on left hand door, below the convenient centralized controls.
- Variable speed drive provides stepless spindle speeds from 40 to 4000 rpm.

Write for full details.

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Available Literature

CATALOGS, BOOKS AND INDUSTRIAL FILMS.....

Gas Burner Catalog describes high and low pressure equipment for all common gaseous fuels. Catalog is divided into 10 sections and contains 130 pages. It is designed as a ready reference source for engineers concerned with the specifications and designs of gas combustion equipment. **Surface Combustion Co., Dept. BB., Toledo 1, O.**

Midget Model 335 Dust Collector is described in new bulletin. Specifications and ratings of Model 335, claimed to be the smallest industrial dust collector, are included. Recommendations for installation and use on small surface grinders, bench, tool grinders, disc and belt sanders, etc., are given. **Aget-Detroit Co., 205 Main at Washington, Ann Arbor, Mich.**

Cooley Laboratory Furnace, used for experimental testing, enameling, fusing, etc., described in bulletin 48A. Furnace is available either with hearth or vertical sliding door, built-in selective power modifier, and manual and automatic control. Temperature ranges from 300° F. to 2000° F. **Cooley Electric Mfg. Corp. 36 So. Shelby St., Indianapolis, Ind.**

History of L. S. Starrett Co. is told in 32 pages and traces the story of the origin, growth and development of the company from the inspiration of the founder to the present day. Booklet is well illustrated and is dedicated to "all those who love fine tools." **L. S. Starrett Co., Dept. BB, Athol, Mass.**

Unified Screw Threads is a digest of the proposed American Standards publication ASA B1. 1 giving information on Unified and American screw standards for screws, bolts, nuts and other threaded parts. Illustrated with drawings, tables. **The Eastern Machine Screw Corp., Dept., BB., New Haven 6, Conn.**

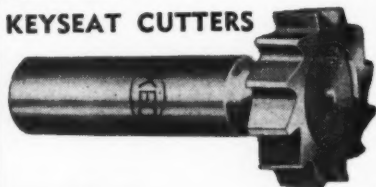
Permanent Magnetic Pulleys contains features, illustrations, specs., dimensions, capacities and typical applications. Pulley are non-electric, require no wiring or electrical connections and can be used under all atmospheric and operating conditions for automatic removal of tramp iron, etc. **Stearns Magnetic, Dept. BB., Milwaukee, Wis.**

Dust Collecting Units. Economical, low-cost methods for collecting and cleaning dust laden air from around industrial machines are outlined in new Torit catalog. Complete information on Torit line of self-contained and cyclone type dust collectors. Describes recent improvements made in certain models and accessories. **Torit Mfg. Co., 303 Walnut St., St. Paul 2, Minn.**

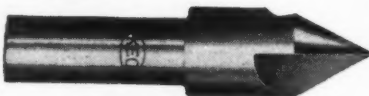
Transformer catalog covers, with the help of over 135 illustrations, the systematic and specialized engineering experience in the designing and manufacture of transformers from ¼ up to 400 KVA and potentials up to 15,000 volts, for every class of service. Specs, applications, technical data. **Eisler Engineering Co., 762 S. 13th St., Newark, N. J.**

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Made of finest high speed steel. Available in all standard sizes. Always in stock for immediate delivery. Specials made to your specifications.

KEYSEAT CUTTERS

High speed. Right hand. $\frac{1}{8}$ " shank. Diameters from $\frac{1}{4}$ " to $1\frac{1}{2}$ ". Standard sizes in stock for immediate delivery. Complete set—41 sizes—available in sturdy, hardwood box. Saves time and money, because you always have the size you need.

**CENTER REAMERS**

High speed steel. Reamers from $\frac{1}{4}$ " to 1" regularly furnished with 60°, 82°, 90° included angle. Specials made to your specifications.

LATHE MANDRELS

Precision made of tool steel, hardened and accurately ground. Tapered .0005" to the inch. Mandrels from $\frac{1}{4}$ " to 1" are .0005" undersize at small end, from $1\frac{1}{4}$ " to 3", .001" undersize. Immediate delivery.

Write for Literature

Illustrated literature and prices on all KEO Products mailed on request.

KEO CUTTERS

19326 Woodward - Detroit 3 Mich.

Chicago Steel Press Brakes Series D are described in 16 pages. Brakes feature patented Non-deflecting Beds which assure equalized bending pressures and uniform cross section of bent forms. Suspension points are spaced evenly to equalize and counteract deflection. Illustrations, specs., applications. **Dreis and Krump Mfg. Co., 7440 S. Loomis Blvd, Chicago 36, Ill.**

Hy-Draulic Shaper has a hydraulically powered table drive and tool feed. Table speeds range from 0 to 110 feet per minute and may be varied infinitely. Table has a working area of $21\frac{1}{2}$ " x 36" and permits normal work height up to 24" above table. **Rockford Machine Tool Co., Dept. BB., Rockford, Ill.**

Bulldog Toolholders especially designed for carbide and cast alloy inserts are described in catalog by Vascoloy-Ramet. Toolholder line includes vertical ejector-type to hold square, round, triangular, rectangular and parallelogram inserts of solid carbide or Tantung cast alloy. Also available are horizontal toolholders and inserts for turning, facing, boring and cut-off operations. **The Vascoloy-Ramet Corp., 800 Market St., Dept. BB., Waukegan, Ill.**

Grinding Fixture for Precision Grinding of Perforators. Permits grinding of irregular shapes concentric with shank within plus or minus .0002". Adjustable stops permit swing to any number of desired degrees. Fixture illustrated and described in 4 pages. **Harig Mfg. Co., 323 N. Albany, Chicago 12, Ill.**

Single Spindle Automation ($2\frac{1}{2}$ "), the "Dialmatic," announced by the Cleveland Automatic Machine Co., features the electric tool drive. Machine is quickly converted from a bar machine to a chucker. Separate, infinitely adjustable feeds can be pre-selected for forward and return motion of each of the five turret positions. Universal camming has been incorporated in the new Dialmatic. Write: **Cleveland Automatic Machine Co., 4934 Beech St., Cincinnati, O.**

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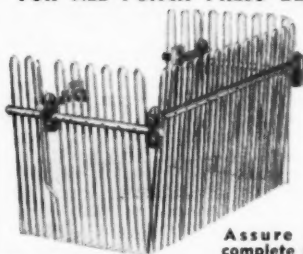
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This pre-mixed, ready-to-use compound cuts TWICE AS FAST as ordinary compounds... (by actual test)... It clings to the points of contact and really grinds... to a fine finish. Then, the silicon carbide washes off in a sludge, quickly and easily. The result... more speed on the production line.

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For precision punching of shim stock up to .025, also rubber, fibre, paper and plastic, the new TRANSPARENT Shim Stock Punch provides an easy and economical answer.

ACCURATE ALIGNMENT is assured because the clear plastic top enables the operator to actually see the work. Overall size: $1\frac{1}{4}'' \times 3'' \times 3\frac{1}{2}''$, which provides for the following standard size holes: $\frac{1}{8}''$, $3/16''$, $1/4''$, $5/16''$, $3/8''$, $7/16''$, $1/2''$, $9/16''$, and $3/4''$. Special sizes built to your specifications. Write today for full details... and begin to enjoy the advantages which only the TRANSPARENT Shim Stock Punch can give your plant.

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305 N. Baum St., Saginaw, Mich.

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AUTOMATIC STAKING MACHINES

Cut your assembly costs with **HIGHSPEED** . . . for staking or riveting fixed or movable joints at a rate of more than 1000 pieces per hour! Foot treadle . . . safe . . . adjustable and uniform hammer blow.

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Let us send you a free survey of your riveting problems. Send samples of your work completed to the riveting stage. We'll return them along with guaranteed production data. No obligation . . . write today.



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LUCIFER...

ELECTRIC HEAT- TREATING FURNACE

MODEL—DL 7052

Set the dial . . . throw the switch, that's all! The furnace climbs to predetermined temperature. Climbs to 1600° F in 40 minutes . . . 2000° F in 72 minutes. Contains over 1725 cubic inches of muffle. Complete with Lucifer 100% automatic electronic control. Muffle size is 12" wide, 12" high, 12" deep.



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New Books

PATENT LAW FOR THE EXECUTIVE AND ENGINEER

231 pages. \$2.95

HOW TO KEEP INVENTION RECORDS

78 pages. \$2.50

Both by **Harry A. Toulmin, Jr., Litt.D., LL.D.** Member of the Bar of the Supreme Court of the United States, the Bar of Ohio, etc.; member of the firm of Toulmin and Toulmin, patent lawyers. Published by Research Press, Inc., Dayton 4, Ohio. 1948. Both are second editions.

The increasing emphasis on new developments, new processes and methods is becoming a prime factor in most of our leading industrial plants, as well as in small shops. While the larger companies maintain their regular research and engineering departments, even the most important are glad to accept ideas which spring from the ingenuity and intelligence of its production men, when one of them comes up with a really clever idea. Many times these have paid off, after the company adopts the suggestion and puts it to practical tests. To a greater or lesser extent, depending upon the generosity of the employer, the original inventor has also reaped some benefit from his plan. In most reputable concerns, this is done on a percentage basis—the inventor receiving a percentage of the savings derived by the adoption of his gadget or his suggestion.

These two books—one thinks of them in a dual sense—are extremely valuable possessions to executives, engineers, designers, manufacturers and institutions of all kinds. The work on Patent Law is a concise, down-to-earth volume which describes exactly how to obtain a valid patent, the requirements of an invention to be patentable, and once acquired, how to protect the patent. The book is written without recourse to "legalese" jargon. It is up to date, based upon the latest decisions of the United States Supreme Court.

The book answers hundreds of ques-

tions in its twenty chapters. It tells the uninitiated how to develop and protect his invention so that he can be successful in making it pay off. It also warns the prospective patent-seeker what he may not do, as well as being a veritable encyclopedia of information as to what he can do for his own protection in the field of Patent Law.

Equally useful is "How to Keep Invention Records". This book tells clearly just what its title implies. It teaches in detail how the inventor can protect his patent property by keeping records to prove his rights. These records include such vital statistics as the date and conception of the invention; the date of disclosure to others, to prove possession of the invention; recording of research results, and the reduction to practice by test and experiment to prove that the invention is successful, and much other parallel and pertinent data.



UNDERGROUND ARTERIES — THE STORY OF TRANSITE PIPE

Johns-Manville,
New York 16, N. Y.

32 minutes. 16 mm. sound film in full color. Arrangements for showings can be made by writing to Johns-Manville, 22 East 40th St., New York 16, N. Y.

This film is somewhat different from the run-of-the-mill industrial film. It opens with a series of scenes showing the importance of pure, fresh water in the daily life of a typical community. Next, attention is directed to the supply and distribution lines, which, since they lie underground, go unnoticed by the average taxpayer. While discussing these "underground arteries" the narrator introduces Transite Pipe. Various steps in the manufacture of this asbestos-cement pipe are shown, followed by scenes illustrating features of Transite Pipe. The film ends with a tribute to the spirit of the men who are responsible for the excellent community water works sys-

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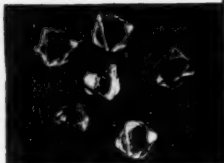
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Efficient
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Built in 3 sizes for cutting keyways 1/16" to 1 1/4" width. Circular upon request.

DAVIS KEYSEATER CO.

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tems now in existence throughout the country.

Through the use of familiar scenes and simple terms, the picture has both an educational and entertainment value. It is of benefit to laymen as well as engineers and professional water-works personnel. The film is available for showing at town meetings, service clubs and other lay groups or for technical societies and organizations.

THE VERSATILE CONTOUR SAW

The DoAll Company
Des Plaines, Ill.

48 minutes. 16mm. sound film in full color. Obtainable from Clint H. Rosene, Director of Relations, The Do-All Company, Des Plaines, Ill.

This useful film gives solutions to many material cutting problems which confront modern industry. The picture demonstrates the latest band sawing techniques and methods that can increase production, save valuable material and reduce cutting tool cost.



**10,000 MARKINGS ON
TRUCK LEAF SPRINGS** (Rochester C-4)

For maximum life on ANY material your stamp should have the NEWCO bevel (Catalog # 5-46)

NEW METHOD
Steel Stamps INC.

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Detroit 7, U. S. A.



One of the highlights of this exceptionally comprehensive film is a sequence on friction sawing, which shows how a hard steel-like hand file can be sliced lengthwise in one second. Three-dimensional contour sawing directly to a layout line is also shown and completely explained along with various other techniques filmed according to research and sawing tests conducted at the DoAll Technical Institute.



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"Controlled Tolerance"
STAMPINGS
**FOR YOUR EXPERIMENTAL
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SHORT RUN STAMPINGS made to your exact specifications in quantities of 3 to 20,000. Stampings for blanking, piercing, forming, drawing, extruding, stencilling, drilling, tapping, etc. are made in any size up to 9" x 12" in any thickness up to 3/16" ... from any material that can be stamped.

Expert die makers, modern precision equipment, experienced workmen and careful inspection, assure you of quality stampings within "controlled tolerances".

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 3610 ALABAMA AVE. (ST. LOUIS PARK)
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"QUALITY STAMPINGS IN SMALL QUANTITIES"

Specially trained and well qualified technicians both from the DoAll organizations or their factories are available for technical session to provide further information on the subjects covered by these films, as well as to demonstrate the equipment.

**1948 AWARDS FOR OUTSTANDING
 SAFETY FILMS**

"Safety Oscars" for outstanding contributions to safety during 1948 have been awarded to four motion pictures and two sound slidefilms.

Four additional films were given honorable mention awards and two others were singled out for special commendation by the National Committee on Films for Safety, representing 20 national organizations, which makes annual awards in the fields of traffic, occupational, home and general safety.

"Driven to Kill," produced for the American Transit Association by Sound Masters, Inc., was judged the best safety motion picture for theater showing.

"The Safest Way," produced for the American Automobile Association by the motion picture studio of Pennsylvania State College, won top honors in the traffic and transportation classification. The

best sound slidefilm in this group was "Award to the Wise," produced for the Zurich Insurance Companies by Paragon Pictures, Inc.

In the occupational division, "This Way Out," produced by American Airlines, Inc., was chosen the best motion picture, and "Helping Hands — Electrical Hand Tools," produced for the Zurich Insurance Companies by Paragon Pictures, Inc., won the best sound slidefilm award.

"Then It Happened," produced by the Forest Service of the U. S. Department of Agriculture, was voted the best motion picture in the general safety field.

Honorable mention awards went to the following motion pictures: "Wheel Sense," produced for the Studebaker Corp. by Transfilm Inc., in the traffic division; "Falling Timber," produced for the Loggers Associations of the Pacific Northwest, Columbia Basin and British Columbia by Rarig Motion Picture Co., in the occupational division, and "Ski Tips," produced by Aetna Life Affiliated Companies, in the general safety division.

"Saga of Sawdust Sam," a sound slidefilm produced for the J. I. Case Co., by Atlas Film Corp., also won an honorable mention award in the general safety field.

News of the industry

N. M. T. B. A. SCHEDULES MORE SALES REFRESHER COURSES

Four summer sales conferences, designed expressly as refresher courses in sales engineering for the machine tool industry, are announced by L. D. McDonald, president of the National Machine Tool Builders' Association, in cooperation with Cornell University, Western Reserve University, Dartmouth College and Purdue University.

The conferences are an expansion of the program started in 1948, when a single course, limited to 50 men, was presented at Cornell University in July. It was the first course of its kind ever devoted exclusively to the sale of capital goods equipment.

As last year, the National Machine Tool Builders' Association and the American Machine Tool Distributors' Association have each named a committee jointly to develop the program, which is to be the same at each conference.

Each conference will last five-and-a-half days beginning on Monday morning and ending Saturday noon. The dates are as follows:

Cornell University, Ithaca, N. Y., July 11 to 16.

Western Reserve University, Cleveland, Ohio, July 25 to 30.

Dartmouth College, Hanover, N. H., August 8 to 13.

Purdue University, Lafayette, Ind. August 15 to 20.

The conferences are open only to sales managers, district managers and salesmen who are employees of members of the National Machine Tool Builders' Association or the American Machine Tool Distributors' Association.

The curriculum will be based on the lectures, problems and discussions during the course at Cornell in July, 1948, and on a textbook which is being published at this time by Professor Harry J. Loberg, who is in charge of the conferences. Professor Loberg is head of the Industrial and Administrative Engineering Department of the College of Engineering at Cornell.

A faculty of resident professors will be selected at each of the host universities, cooperating with members of the industry under the general direction of Professor Loberg. Application forms will be distributed by the two associations to their members within the month. Attendance at each of the conferences will be limited to the available housing assigned.

RESISTANCE WELDING SUPPLY FIRM ADDS NEW PLANT

The Weldaloy Products Company, Detroit, have purchased and are operating a new modern plant adjoining their present location.

According to James A. O'Grady, president, "Due to the ever increasing use of resistance welding in industry, we have been forced to increase our production

to meet customers' demands. The new plant is completely equipped with the latest machines and is used to produce special types of resistance welding supplies."

The metallurgical research and engineering divisions of Weldaloy are housed in the new plant and are under the direction of C. R. "Bob" Shroder.

AMERICAN DRILL BUSHING COMPANY MOVES

American Drill Bushing Company, Los Angeles 21, California, announces the opening of its new, modern office headquarters and manufacturing plant at 1608 Essex Street. The plant occupying a large area, provides ample parking space,



and additional room for equipment and increased production facilities. Storage space is provided for maintaining complete stocks of bushings for immediate delivery. The complete list of stock carried exceeds one and one half million bushings.

The phenomenal growth of the company has resulted in the outgrowing of three previous locations. Now with the

increased facilities for production, added personnel and new equipment, it has become the largest drill jig bushing manufacturer in the entire West.

The engineering department is completely staffed and competent to handle any drill bushing problem that might occur. In research and unusual technical requests, American Drill Bushing Co. welcome the opportunity to turn over the necessary staff and facilities to solve customer problems quickly and satisfactorily. Their own heat treating plant helps to produce special bushings in a matter of a few hours when necessary.

With the industrial growth of the West, the company finds an increasing demand for their products; it is well represented by distributors carrying a complete stock of American Drill Bushings for immediate delivery anywhere in the U.S. or Canada.

The Denison Engineering Company, Columbus 16, Ohio, has announced the appointment of **The Henry Walke Company**, 1310 South Tryon St., Charlotte, N. C., to represent their Multipress line in North and South Carolina.



You Need Only 1 DORMAN TAPPER

AUTOMATIC REVERSE

... instead of 3 ordinary tappers to tap
No. 2-56 to $\frac{3}{8}$ " in steel!

PLUS AUTOMATIC TORQUE CONTROL

Friction Drive once set operates AUTOMATICALLY
to PREVENT TAP BREAKAGE

NO CONTROLLED PRESSURE OR SKILL NEEDED
BY OPERATOR

LOW PRICE . . . No. 1 SIZE M.T.S.

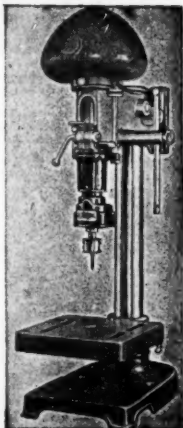
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3 LARGER SIZES — POSITIVE DRIVE

2-B Cap. $\frac{3}{8}$ " to $\frac{1}{2}$ " in Steel. 3-A Cap. $\frac{1}{2}$ " to $1\frac{1}{4}$ " in Steel.
4-A Cap. $\frac{3}{4}$ " to 2" in steel incl. pipe taps.

ALL UNITS EFFICIENT AS PRODUCTION THREADERS USING
ROUND SPLIT • BUTTON • ACORN DIES

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DORMAN MACHINE TOOL WORKS 40 S. Mac Questen Parkway, Mount Vernon, N. Y.

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279

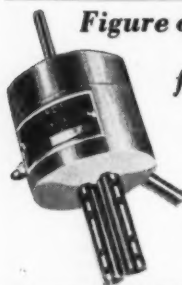


Figure on . . . TAPORDRIL
for Close Center

- ★ DRILLING
- ★ TAPPING
- ★ REAMING
- ★ COUNTER SINKING

The new TAPORDRIL is a sturdy high speed driving unit, designed for drilling or tapping two or more holes on close center work. Used in a drill chuck or tapping attachment, it provides an efficient and economical means of drilling, reaming, tapping or counter sinking. Needle bearings are available in some sizes.

Several good territories available.

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THRIFTMASTER

makes a Complete Line of

ADJUSTABLE FIXED CENTER DRILLHEADS

For every drilling, tapping, boring and reaming job, there's a Thriftmaster high quality drillhead. Thriftmaster engineers will study your requirements and if necessary design special equipment for you.

Write for free literature on the complete Thriftmaster line.

Thriftmaster Universal — 2 to 6 spindles.
Prices from \$158.00. Immediate Delivery.

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1030 North Plum St., Lancaster, Pa.

SOCIETY OF CARBIDE ENGINEERS SPONSORS PRIZE CONTEST

The Society of Carbide Engineers has recently announced that it will award a prize of \$50.00 to the person who submits to them the most outstanding article pertaining to the use of Cemented Tungsten Carbides. The society, formed several years ago for the main purpose of purveying knowledge to its members in the use of carbides, believes this is one of the best methods of obtaining some of this valuable information. The society plans to print all noteworthy articles it receives in its monthly paper. A copy will be sent to all individuals who submit articles that are printed, and authorship will be acknowledged.

This contest is open to anyone except the executive committee of the society and the contest judges. A certificate will be included with the \$50.00 prize to the author of the winning article. All entries will become the property of Society of Carbide Engineers.

All entries must be in the hands of the society not later than October 15, 1949. The winner will be announced on December 8, 1949. Judges decision will be final. All inquiries and articles, should be mailed to: The Society of Carbide Engineers, P.O. Box 141, West Hartford, Conn.

SPECIAL CUTTER & TOOL CO.

Standard Reamer & Tool Co., Detroit, Mich., announces a change in both name and address. This company has specialized since 1920 in the manufacture of reamers, cutters and special tools to customers' specifications; and to indicate its field of activity more clearly, the company will henceforth be known as Special Cutter & Tool Co.

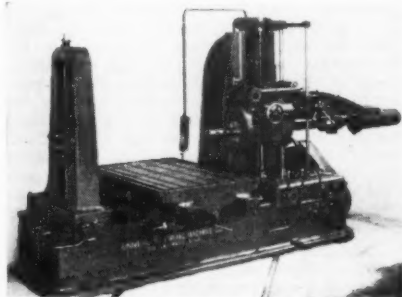
All business, engineering and manufacturing activities have recently been transferred to new headquarters at 401 Salliotte St., Ecorse, Mich., and national distribution is being set up to serve customers throughout the country.

WARD LEONARD MOVES OFFICES

Ward Leonard Electric Co., Mount Vernon, N. Y. has announced that its general office has been moved from the factory building at 31 South Street to a new office building at 115 South MacQuesten Parkway, Mount Vernon, N. Y. The telephone number remains the same—FAIRbanks 4-1015. The new general office includes executive and sales offices, and the company's headquarters for all operations.

BULLARD COMPANY ACQUIRES UNIVERSAL BORING MACHINE CO.

The Bullard Company, Bridgeport, Connecticut, manufacturers of Vertical Turret Lathes, Mult-Au-Matic Lathes, Bullard Spacers and the 30-H Three Spindle Horizontal Lathe have acquired the business and products of the Universal Boring Machine Company of Hudson, Massachusetts.



The manufacture of Horizontal Boring Mills similar to the 4" model, il-

lustrated, will be continued at the Bullard plant. The machines will be known as Bullard-Universal Boring Machines and will be offered in three sizes consisting of 3-inch, 4-inch, and 5-inch spindle sizes. There are three sets of varied specifications of bed lengths, table sizes and vertical ranges for the 3 and 4-inch machines, and 2 sets of varied specifications for the 5-inch machine.

One of the outstanding advancements in the boring machine field is the Hydro-dynamic coupling between the motor and machine which through smoother power input improves operations at all speeds. Another of the Universal products which Bullard will continue to manufacture is the Precision Machine Aligning Level in 18-inch and 27-inch lengths having accuracy of .0003 of an inch per foot.

Production on several machines has already started at the Bullard plant.

Johnson **INCLINABLE POWER PRESSES** give you up to 8 INCHES MORE in the "EARNING SPACE"

Between the bed and the gibs, in the depth of the standard stroke, you find the earning capacity of a power press. All regular Johnsons have the edge on other presses in this respect. Furthermore, Johnson can cast special frames to add inch increments to the stroke at negligible cost.

YOUR DIE DOLLAR BRINGS GREATEST RETURNS WHEN PRODUCTION IS SCHEDULED ON A JOHNSON PRESS.

Write or call Johnson for specifications on six models of inclinable power presses now building. Tell us about your work. Chances are a Johnson can do a better job.



Johnson
MACHINE and PRESS CORP.

620 WEST INDIANA AVENUE • ELKHART, IND.

G. E. PLANS NEW SERVICE SHOP IN RICHMOND

To provide better repair, maintenance, and warehousing facilities for its customers in Virginia, General Electric will establish a new apparatus service shop and warehouse in Richmond late this summer, it was announced recently by H. V. Whitney, manager of the company's apparatus office in Richmond.

Set up to service and repair motors, generators, transformers, control devices, switchgear, and other apparatus, Whitney said, the new service shop will contain the latest in machine tools.

Whitney stated that the new shop will, in effect, bring the factory closer to the customer, since it will be staffed and supervised by men thoroughly trained in factory practices. The same workmanship and materials that go into G-E apparatus built in the company factories will be used in the new shop, which will be the 29th in the chain of G-E apparatus service shops across the country.

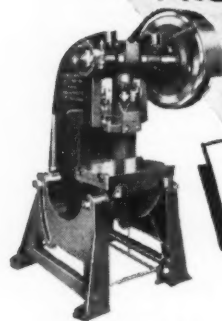
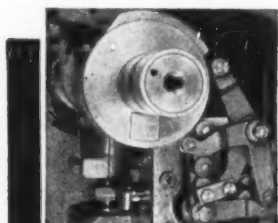
The warehousing facilities, Whitney explained, will cut down the delivery time of many G-E apparatus products to customers because many standard items will be carried in the Richmond warehouse

stock. The latest lighting, machine layout, and wiring systems will be incorporated in the new building, according to Whitney. Plans also call for a railroad siding to service the building and traveling cranes in each of the three main bays.

BLACK & DECKER INDIANAPOLIS SERVICE STATION

The Black & Decker Manufacturing Co., Towson, Maryland has announced that its Indianapolis Service Station has moved to a new building located at 1125 West 16th Street. This new location in Indianapolis was built to the specifications of this famous manufacturer of portable electric tools, and offers greatly increased facilities for the prompt, efficient service of Black & Decker, Van Dorn and Home-Utility products. It is manned by factory-trained personnel to repair and service the over 100 products of the company, and has an increased stock of genuine replacement parts.

This Service Station also is provided with a show room displaying a large range of the Company's tools. The branch will be in charge of J. T. Redmon, service engineer, and M. D. Mooers, sales engineer.



6 MODELS
5 to 30
ton cap.

**CUTS
PRODUCTION
COSTS**

HOW BUILT IN SAFETY OF . . .

**PRESS-RITE
PUNCH PRESSES**

EXCLUSIVE—Single stroke non-repeat safety mechanism increases operator efficiency. Allows ample time to check dies and align material resulting in increased output, fewer rejects, and less down time for repair and maintenance.

Other cost cutting Press-Rite features are:

- Automatic cam actuated brake
- Greater shut height clearance

See the Press-Rite Presses at your dealer or . . .

Write for Bulletin No. P348-B

Sales Service Machine Tool Co.

2363 UNIVERSITY AVENUE
ST. PAUL 4, MINNESOTA

INDEX OF NEW ORDERS AND SHIPMENTS OF MACHINE TOOLS

Base—Average Shipments 1945-1946-1947=100 %

Date	New Orders (Total)	Foreign Orders (Included in Total)	Shipments		Ratio: Unfilled Orders to Shipments (As Reported)
			(Total)	(3 Mo. Avg.) (Centered)	
1947					
Nov.	75.6	11.5	84.7		5.1-1
Dec.	81.1	14.8	98.4		4.1-1
1948					
Jan.	83.1	14.0	75.3	86.9	5.4-1
Feb.	77.3	12.7	87.1	82.0	4.7-1
Mar.	86.3	16.1	83.6	84.2	4.6-1
Apr.	86.3	14.1	82.0	82.7	4.7-1
May	73.5	11.4	82.6	86.3	4.5-1
June	83.4	11.9	94.4	79.8	3.8-1
July	74.0	13.3	62.4	75.5	5.9-1
Aug.	73.7	13.6	69.8	72.3	5.2-1
Sept.	73.1	11.6	84.7	78.3	4.2-1
Oct.	67.4	14.0	80.4	80.4	4.2-1
Nov.	72.2	18.1	76.2	84.5	4.4-1
Dec.	76.7	16.2	96.9	80.6	3.2-1
1949					
Jan.	87.0	21.9	68.8	78.7	4.6-1
Feb.	80.9	26.5	70.3	p 71.5	4.7-1
Mar.	p 93.1	p 22.3	p 75.3		p 4.4-1

p - Preliminary figures

ABRASIVE SURFACE GRINDERS

EXCLUSIVE AGENTS

ASHEVILLE, N. C.
Tidewater Supply
Co., Inc.

ATLANTA 1, GA.
Childs, W. P.
845 Memorial Drive S. E.
P. O. Box 700

BIRMINGHAM 2, ALA.
Young & Vann Supply Co.
1725-1731 First Ave.

BOSTON 16, MASS.
Rudel Machinery Co., Inc.
532 Statler Bldg.

BUFFALO 7, N. Y.
Keller, George Machy. Co.
1807 Elmwood Ave.

CHICAGO 6, ILL.
Marshall & Huchart
Machy. Co.
571 Washington Bldg.

CINCINNATI 2, OHIO
Metch & Merryweather
Machy. Co.
First National
Bank Bldg.

ABRASIVE MACHINE TOOL CO.
EAST PROVIDENCE 14, R. I.

CLEVELAND 13, OHIO
Metch & Merryweather
Machy. Co.

COLUMBIA, S. C.
Tidewater Supply Co.
DAYTON, OHIO
Metch & Merryweather
Machy. Co.

DETROIT 2, MICH.
Cheney, G. H. &
W. H. Moreton
5735 Cass Ave.

INDIANAPOLIS 4, I.
Marshall & Huchart
Machy. Co. of Ind.
Chamber of Commerce
Building

KANSAS CITY, MO.
Blackman & Nuetzel
Machy. Co.

KNOXVILLE 5, TENN.
Murrain, The W. S. Co.
912 W. Clinch Ave.

LOS ANGELES 21, C.
Henes-Morgan
Machy. Co. Ltd.
2026 Santa Fe Ave.

MINNEAPOLIS 1, M.
Satterlee Co., The
118-120 Washington
Ave., N.

NEW ORLEANS 6, LA.
Dixie Mill Supply Co., Inc.
901 Tchoupitoulas

NEW YORK CITY 17
Rudel Machinery Co., Inc.
100 East 42nd St.

NORFOLK 1, VA.
Tidewater Supply
Co., Inc.
P. O. Box 839

OMAHA 2, NEB.
Cardinal Supply &
Mfg. Co.
427-30 Sunderland Bldg.

PHILADELPHIA 3, PA.
Swind Machinery Co.
Broad St. Station Bldg.

PITTSBURGH 22, PA.
Metch & Merryweather
Machy. Co.
717 Liberty Ave.

ROANOKE, VA.
Tidewater Supply Co.

ROCHESTER 4, N. Y.
Keller, George Machy. Co.
509 Commerce Bldg.

SAN FRANCISCO 7, C.
Janison Machinery Co.
20th & Tennessee Sts.

SEATTLE 4, WASH.
Hallidie Machinery Co.
2726 First Ave., S.

SHREVEPORT, LA.
Dixie Mill Supply
Co., Inc.
200 Edwards Street

ST. LOUIS 8, MO.
Blackman & Nuetzel
Machy. Co.
3713 Washington Blvd.

SYRACUSE 2, N. Y.
Briggs, C. H. Mach.
Tool Co. Inc.
Onondaga Hotel Bldg.

W. HARTFORD 7, CT.
Rudel Machinery Co., Inc.
7 South Main St.

ABRASIVE

ACCURACY BOOSTS PRODUCTION

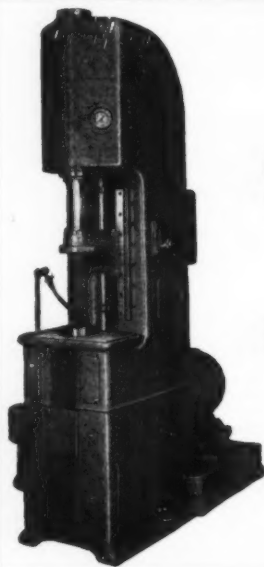
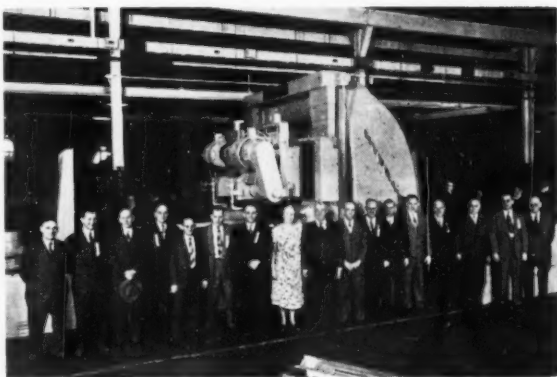
THOMPSON GRINDER HONORS 20-YEAR EMPLOYEES AT OPEN HOUSE

At an open house, attended by several thousand persons including visiting manufacturers, newspaper men and editors, The Thompson Grinder Company of Springfield, Ohio formally announced two new and completely different machine tools.

At the same time Christian Baldenhofer, president, honored all employees having over 20 years service with the company. The group is shown in front of the new Thompson Hydrail Surface Grinder. The original pioneering Thompson Grinder was also exhibited.

Crowds were impressed by the massiveness of the Hydrail machine and its ability to take huge railroad wheel housings with wheels mounted. The machine weighed at over 130,000 pounds and is destined for England. Equally amazing was the produc-

tion rate of four thousand parts per hour on the new Thompson Truformatic Contour Grinder. This machine is totally enclosed and crushes and grinds gangs of automobile lock bearing surfaces entirely automatically.



The New *Guided Ram* High Speed Hydraulic Press

For Fast Assembly and Broaching

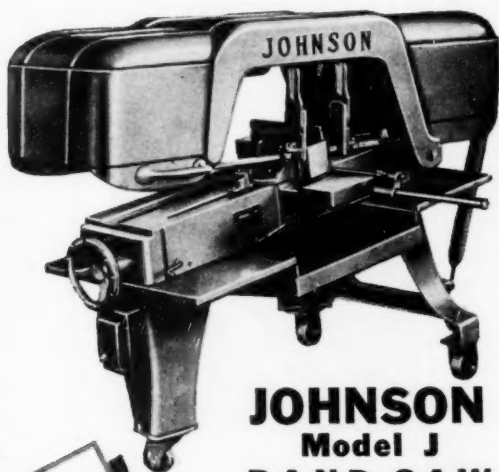
WRITE FOR BULLETIN 357-11

GREENERD ARBOR PRESS CO.

Nashua, N. H.

Write your own ticket
in metal cut-off capacity

10" x 18"



**JOHNSON
Model J
BAND SAW**

Sturdy and fast, with the extra rigidity that permits higher speed operation without shortening blade life, and the extra accuracy that cuts square and true, saving machining time. Extra capacity too—10" rounds, 18" flats. It's everything you want in a band saw.

5" x 10"



**JOHNSON
Model B
BAND SAW**

A smaller, lighter, portable version of the Model J, with the same three-point-supported rigidity, and all the weight required for its capacity. All the accuracy and speed of the larger model. If you have metal cut-off work up to 5" rounds, 10" flats, this is the ideal tool for it.

Catalogs
for the asking
—Write

**JOHNSON
MANUFACTURING CORP.
ALBION, MICHIGAN**

Obituaries

EBEN J. FULLAM — 1871-1949

With profound regret, The Fellows Gear Shaper Co., Springfield, Vt., has announced the death of Eben J. Fullam, chairman of the board of directors of the company, at his winter home in Mount Dora, Florida, on April 26, at the age of 78.



Eben J. Fullam was born March 20, 1871, in Ludlow, Vermont. His early education included attendance at the Black River Academy with the late President Calvin Coolidge. He was a graduate of Middlebury College, Middlebury, Vt.

Mr. Fullam became associated with The Fellows Gear Shaper Company on February 7, 1898. He was elected treasurer January 12, 1899, and held this office until he assumed the vice-presidency on January 1, 1939. Since his election as a director in 1916, he served continuously in that capacity. He became the third president of the firm on September 3, 1945. On November 6, 1948, he retired as president and was elected chairman of the board of directors.

From 1931 to 1935, Mr. Fullam was also president of the Bryant Chucking Grinder Co. He was a former president

of the First National Bank of Springfield, Vermont, and at one time served as a director of the National Machine Tool Builders' Association. During the past few years, he had been a director of Vermont Foundries.

ALVIN BARTHOLOMEW EINIG, 1884-1949

Alvin B. Einig, general manager and director of Motch & Merryweather Machinery Co., Cleveland, Ohio, died Sunday, February 27, 1949 at St. Vincent's Hospital in Cleveland.

Mr. Einig was widely-known in the machine tool business, having been concerned with the distribution of metal-working machinery in manufacturing centers of the middle west for 40 years. Born in Defiance, Ohio August 9, 1884, he began his machine tool career as a part-time apprentice at Standard Tool Co., Cleveland, in 1901—continuing his work there until 1906. He also worked as an engineering apprentice at Cleveland Hardware Co. and with Allis-Chalmers Mfg. Co.

Mr. Einig studied engineering at Case School of Applied Science, Cleveland, where he graduated with a B.S. degree in Mechanical Engineering. Following his graduation, he joined the Motch & Merryweather Machinery Co., being located in the Cincinnati territory from 1909 until 1912. During the years when he spent much time "on the road", he became acquainted with many men who were destined to become nationally-known industrial figures.

When General Knudsen was called to Washington to head up the Office of Production Management—later the War Production Board—of the second World War, he brought A. B. Einig into the picture as Administrative Officer of the Tools Division. Mr. Einig continued to be active in this division throughout the critical "tooling up" period and won high praise for his ability in obtaining and placing critical machine tools in the war industries and in the Army, Navy, and Air Corps plants.

Mr. Einig was a member of Sigma Xi; Tau Beta Pi; American Society of Mechanical Engineers; Army Ordnance Association; Society of American Military Engineers; Cleveland Engineering Society, (Trustee 1947-1949); University Club of Cleveland; and Knights of Columbus. He served two terms as president of the American Machine Tool Distributors' Association (1945-1946).

WORTHINGTON EXECUTIVE PASSES

C. Neal Barney, vice president, secretary and general counsel of Worthington Pump and Machinery Corporation, New York, passed away at his home in Scarsdale, N. Y., Sunday April 24, at the age of 73 years.

He was a native of Lynn, Mass., graduated from Tufts College in 1895; took his law degree at Boston University and then returned to Tufts for further post-graduate study. Later he was a lecturer at the law schools of both Northeastern and Boston Universities. He was a Republican Presidential Elector in 1908, and a former mayor of Lynn. He was chairman of the legal advisory committee for the draft board in Lynn during World War I. He was also a trustee for Tufts from 1909 to 1921.

Mr. Barney joined Worthington as chief counsel and secretary in 1918; was appointed secretary-treasurer in 1932; and was elected vice president and secretary in 1942.

At the time of his death, Mr. Barney was president of the Maria Mitchell Association, Nantucket, and was a member of Theta Delta Chi, Phi Beta Kappa, the Society of Mayflower Descendants, the Newcomen Society, the Pacific Club, the University Club and the Massachusetts, New York State, and American Bar Associations.

DR. ARISTIDE FANTI — 1868-1949

Dr. Aristide Fanti, Scientific Librarian of the National Bureau of Standards from 1910 to 1938, died on April 5 in Cheverly, Maryland, after a brief illness.

Dr. Fanti was born in Capri, Italy, on October 11, 1868. He was educated at the Universities of Parma, Bologna, and Pavia, obtaining his doctorate in mathematics from the University of Pavia.

After teaching in the Berlitz School of Languages in Berlin and London, he came to the United States in 1904, when he became a member of the staff of the Library of Congress, working in the Catalog Division. He remained there until 1910 when he was appointed Scientific Librarian of the National Bureau of Standards.

Dr. Fanti's knowledge of languages, his wide background in the physical sciences and mathematics, and his extensive knowledge of European scientific literature and institutions qualified him for the librarianship of the Bureau, where he was instrumental in establishing it as one of the best scientific libraries in the United States.

CUTTERS



Hand Power Lever Action

**RODS for FLAT BARS ANGLES
WIRE ROPE**

Send for circular.

T. H. LEWTHWAITE MACHINE CO.

312 East 47th St., New York 17, N. Y.



for faster Production

LITTELL Automatic Centering Reels are constructed with four arms which operate all at the same time. A free loop of material is supplied to automatic feed, regardless of weight of coil.

Littell Reels are made in 100-lb. to 20,000-lb. capacities. Automatic spindle and cradle types. Plain and motor-driven. Used in thousands of plants for faster production.

Other Littell products include Roll Feeds, Dial Feeds, Magazine Feeds, Air Valves, Straighteners, Scrap Winders, Pres-Vac Safety Feeders, **REQUEST BULLETINS.** Mechanical Pickers, etc.

F. J. LITTELL MACHINE CO.

4153 Ravenswood Ave., Chicago 13, Ill.



U. S. No. 1 MILLING MACHINE

has proved itself the number one value in medium size, all purpose hand milling machines. New universal attachment doubles its scope. Send for information.

The U. S. MACHINE TOOL CO.

A Division of U. S. Burke Machine Tool Co.
20 East 72nd St. Cincinnati 16, Ohio



Appointment of **Fred L. Way** as sales manager of the Rust Prevention Division has been announced by G. A. Daurbert, president, Nox-Rust Chemical Corporation, Chicago, Ill.



Fred L. Way



Victor Ladetto

GRANT

RIVETERS...

**PIONEERS
and
PACEMAKERS
in their line**



—head rivets from smallest to 1/2" diameter either by NOISELESS SPINNING or VIBRATING HAMMER method—Sizes to meet all needs—Types include Vertical and Horizontal Multiple Spindles.

Write for literature and don't forget to send samples.

THE GRANT MFG. & MACHINE CO.
C E Station, Bridgeport 5, Conn.

The Continental Screw Co., New Bedford, Mass., announces the appointment of **Victor Ladetto** as sales manager and **Donald H. Sleeper** as assistant sales manager.

Alvin Marcus, president of the Marcus Transformer Co., Inc., Hillside, N. J., announces the appointment of **Robert A. Young & Co.**, Petroleum Building, 714 West Olympic Boulevard, Los Angeles 15, Calif., as territorial representative for Southern California and Arizona.

Andrew Wyzenbeek, president of Wyzenbeek & Staff, Inc., Chicago, manufacturers of flexible shaft tools, has announced the appointment of **Robert L. Burke** as general manager of the company.

Walter A. Stewart, trustee and former president of American Optical Company, Southbridge, Mass., was elected president by the company's trustees.

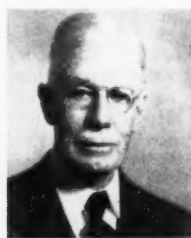
J. H. Tredinnick was recently named vice president of **E. W. Bliss Company**, Toledo, Ohio, it was announced.



J. H. Tredinnick



Spencer Montgomery



Sidney E. Horton



L. McGregor Demarest

At a recent meeting of the stockholders of the **E. Horton and Son Company**, Windsor Locks, Conn., the following directors were elected: **Donald B. Hunting**, **Douglas H. Thompson**, **Paul W. Adams**, **H. Bissell Carey, Jr.**, **Mary A. Caffrey**, **L. McGregor Demarest**, **Spencer Montgomery**, and **Sidney E. Horton**. Immediately following the stockholders' meeting, the directors elected the following officers: **Donald B. Hunting**,

president; **Douglas H. Thompson**, vice-president and treasurer; **Mary A. Caffrey**, secretary.

The appointment of **L. M. Gumm** as Metal Working Consultant for the Industrial Sales Department was recently announced by **R. S. Kersh**, Manager of the Industrial Sales Department, Westinghouse Electric Corporation, East Pittsburgh, Pa. Also announced was the appointment of **K. M. Patterson** as manager of the Steel Mill and Metal Working Section.

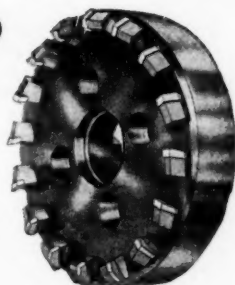
"EXCELLENT RESULTS" says Alpha



HOWALD

INSERTED BLADE

Face, End
& Shell Mills
for
Best Results
at
Low Cost



For practical carbide milling ideas, write for Bulletin 23B

W. T. HOWALD MACHINE WORKS
182 Sigourney Street Brooklyn 31, N. Y.

Dr. Hans Kohler has been appointed to the staff of the National Bureau of Standards, Washington D. C., where he will be concerned with theoretical work in the Electronics Division.

Appointment of **Richard E. Hitchcock** as field engineer and sales representative for the New York area was recently announced by Ellwood G. Peterson, president, Hannifin Corporation, Chicago.

Farrel-Birmingham Company, Inc., Ansonia, Conn., announces the appointment of **M. H. Blank** as representative in the Detroit area to handle the sale of gears and gear units manufactured at the company's Buffalo, New York plant.

John H. Vohr has been promoted to the position of general superintendent of the Gary Steel Works, U. S. Steel subsidiary corporation. He succeeds **Stephen M. Jenks**, promoted to Chicago district manager of operations for the firm.

The appointment of **John Z. Linsenmeyer** as manager of mining, petroleum and chemical engineering for the Westinghouse Electric Corporation has been announced by J. C. Fink, manager of the company's industry engineering department.

Jessop Steel Company, Washington, Pa., announces the following promotions: **Arthur B. Cooper**, as assistant to vice president in charge of operations, C. A. Gordon. Mr. Cooper was formerly assistant general superintendent. **Edwin C. Thomas, Jr.**, as general superintendent; **Benjamin H. Brown**, as superintendent of electric furnace department; **Joseph W. Stier**, as superintendent of scheduling.

William J. Sinek was elected president of City Products Corporation, Cleveland, at a meeting of the board of directors. The action followed re-election of the board and adoption of the name, "City Products Corporation," replacing the former name "The City Ice and Fuel Company," by the stockholders.

Yes!

WE DO MAKE
SPECIAL
ASSEMBLING MACHINES

Motorized Hopper Units by the Detroit Power Screwdriver Company are "tailor-made" for special assembling applications . . . They eliminate the manual handling of parts . . . Let us solve your production assembling problem . . . Contact us now; send special assembly and component parts for quotation.



Automatic assembly of toy plastic wheels and axles.



Pressing terminal studs in dry cell batteries.



Assembling screw and fibre washer to cable clamp for electrical outlet box for shipping purposes.

DETROIT POWER SCREWDRIVER CO.
2809 W. FORT ST.
DETROIT 16, MICH.

Howard N. Maynard, president of Snyder Tool & Engineering Company, Detroit, announces the promotion of **Leo P. Gajda** from the position of chief draftsman to Director of Engineering. He succeeds **George D. Melling** who held the position since 1946 and who leaves Snyder to form his own company in partnership with Howard McCoy. The new company will be known as McCoy-Melling and will represent Snyder throughout Michigan, excluding the Detroit metropolitan area.

The appointment of three new sales representatives for the Detroit Die Set Co., was announced by Harold E. Stokes, vice-president of sales; **Nelson R. Church**, Pawtucket, R. I., will direct sales in that state as well as Massachusetts, Vermont, New Hampshire and Maine; **E. M. Benson**, Meridian, Conn., was appointed as Connecticut representative; sales in New York City, Long Island, and northern New Jersey will be supervised by **C. W. Keeny** of Benson and Church Company, Newark, N. J.

Arthur A. Blue has been appointed manager of the Instrument Division of Thomas A. Edison, Incorporated, West Orange, N. J. according to an announcement by Charles Edison, president of the Company.

Appointment of **R. E. Kenney** of Minneapolis, Minn. as Mid-West sales representative for the Kold-Hold Manufacturing Co., has been announced by J. R. Tranter, president.

Acme Steel Company, Chicago, recently announced the appointment of **W. S. Huss** as sales manager of the Southern Division, with headquarters in Atlanta, Georgia. Assisting him will be **J. C. Brill**, New Orleans district manager, and **C. A. Carrell** and **W. G. Polley**, special representatives.

Robert E. O'Brien has been named district representative in the Cleveland territory by Heppenstall Company, Pittsburgh.

New Britain UNIVERSAL VISE

THE ORIGINAL

Swivels 360 degrees horizontally,
100 degrees vertically, to
give any angle or com-
pound of
angles.



Write for
Further
Information.

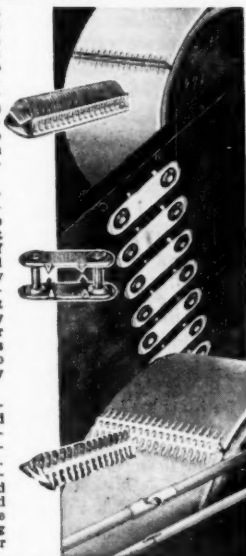
NEW BRITAIN TOOL & MFG. CO.
NEW BRITAIN, CONN., U. S. A.

WIREGRIP precision made Belt Hooks come with extra (patented) blue aligning cards — are held more rigid, assuring perfect alignment of hooks—less hook loss from handling—a better job when applied with any make lacing machine. 6 sizes.

PLATEGRIP Fasteners for . . . Conveyor Belts. Make strong dust-tight joints in belts, of any width. Spread tension uniformly across belt, allow natural troughing of belt and operate smoothly over flat, crowned or take-up pulleys. Sizes for belts from $\frac{1}{4}$ " to $1\frac{1}{2}$ " thick. Easily applied anywhere.

STEELGRIP Flexible Lacing, applied with a hammer, clinches over and protects end of belt. Makes strong, flexible joints. Boxed with 2-piece hinged rocker pins or can be obtained in long lengths for conveyor belt use.

Armstrong-Bray & Co. The Belt Lacing People
5364 NORTHWEST HWY., CHICAGO, ILLINOIS



Shop Hints

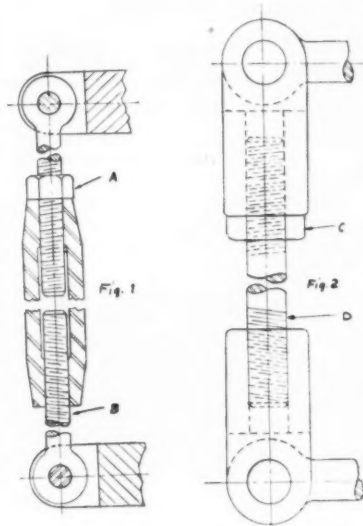
TURNBUCKLES AND CLEVISES

H. F. Williams

The common purpose of a turnbuckle is to fix several members by tightening. This may apply to machine tools, but in this instance we are interested only as such an assembly acts as adjustable link to either shorten or lengthen the distance between two pivot points. In the common turnbuckle illustrated in figure 1, the adjusting member connects the two screw members, in this case I-bolts. In the use of a clevis assembly to perform in a like manner as above stated, the screw is the adjusting member, connecting the two clevises as shown in Figure 2. In either case each assembly has two screw threads, one right hand and one left hand. Whether these assemblies are made from purchased parts or are made in the machine shop as regular details, it is usual to see them equipped with two lock or check nuts, one for the right hand thread and one for the left hand thread.

When both ends are arranged as shown in figures 1 and 2, where the connected members operate in one plane, the question arises why it is necessary to use two locking nuts. The drawings herewith show but one nut used, namely on the right hand threaded screws at A and C, which, of course, is available from stock. The special left hand threaded nut, usually applied and B and D need not be used, because when a single nut is locked in place, in this case the right hand threaded nut,

the whole assembly cannot lengthen or shorten through vibration or shake. It is understood, of course, that both ends operate in a single plane as shown and cannot themselves be rotated about the axis of the turnbuckle or clevis assembly. It could be debated that the threads could be of a loose fit. This might be a moot question even though a looseness of as much as .005" existed in the threads, it would not change the length materially. However, if such a



small amount of looseness were objectionable, the threads could be specified to have a snug fit in the tapped holes.

If the adjusting member of figure 1, or the clevises in figure 2 are purchased and the screw members made in one's own shop, a left hand tap would not have to be maintained. If no tap were available, it would be awkward to chase out a hex nut with a left hand thread. If, however, all the pieces were made

in the shop, even though a left hand tap had to be available, one special piece could be saved the cost reduced thereby. Records and bin storage space would also not have to be maintained.

This same principle applies to all forms of adjustable rods and linkages employing yokes or other types of special ends where right and left hand threads are employed for adjustment.

TURNING JOURNAL BEARINGS AND CRANKSHAFT CHEEKS

High production of Diesel engines required in the struggle to balance power generation capacity with rising electrical load is bringing new tasks to giant engine lathes.

Here on a lathe at Nordberg Mfg. Co., Milwaukee, is one-half of a crankshaft for a ten-cylinder Diesel engine.

This giant stationary Diesel has a 29 in. bore, 40 in. stroke, and a rating of 7,100 HP.

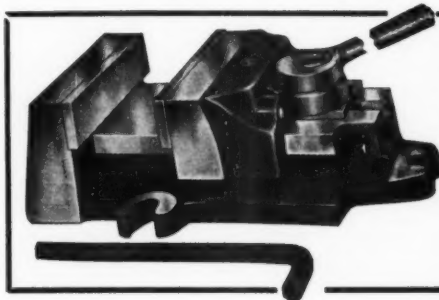
This five throw crankshaft section on the Mackintosh-Hemphill lathe is a single forging about 23½ ft. long and weighing about 22 tons.

The 84 in. by 50 ft. lathe is being used for turning the journal bearings and crankshaft cheeks. Lathe carriages are fed longitudinally by a heavy



feed screw mounted on the bed between front and middle ways. Carriage cross feed is obtained from a lead screw mounted on front of the bed. A 75 HP motor is used to drive the headstock.

An even larger lathe was turned out during early days of World War II. It was 114 ft. long, 8 ft. high, weighed 250,000 lbs., and required 6 gondola cars for shipment.



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HOBGING AND TURNING MARINE BULL GEARS

In a modern turbine-driven ship the biggest and heaviest single unit of its machinery, the bull gear, is also just about the most microscopically accurate thing aboard. Although weight of the two gears and the shaft shown being machined at the Sunnyvale, California plant of the Westinghouse Electric Corp. is 51,200 pounds, tolerances for the operation must be held to as close as 0.0003 inches. The two wheels are welded together on a shaft to form the final stage of a gear train that reduces the 6000 rpm of a 7500 horsepower turbine to the approximately 100 rpm required in the propeller drive. Diameter of each bull-gear wheel is 146.392 inches. The welding operation of the unit was described in the March issue of the BLUE BOOK, page 167.

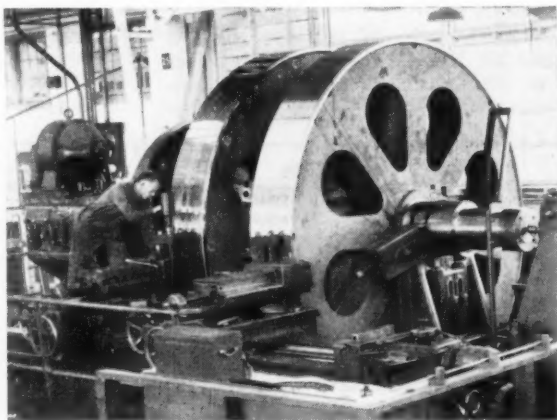
The two bull-gear wheels have opposite helixes, each containing 693 teeth with a diametral pitch of five. The two helixes must intersect at an hypothetical line exactly midway between the two inner rims. Hubs of the gear are forged steel, sides are of steel plate, and the rims and shaft are high-carbon-steel forgings.

The wheels are turned on a big lathe as shown in Fig. 1. This consists of four major operations: for the wheel diameters, faces of rims, beveled corners, and wheel shoulders or "dowels." Accuracy surpasses that found in a fine watch. For any of these surfaces, the maximum "indicator runout", the amount that dimensions may vary from the computed figures, is less than three ten-thousandths of an inch. The shaft is supported on steady rests and lathe centers.

Great care is taken to make sure that the big wheels and their shaft are properly aligned before machining. The shaft is turned true to ensure that the wheels will turn in the exact vertical plane of the shaft journals. Prior to the lathe machining, the wheel has been completely welded, normalized, and shrunk on its shaft.

Hobbing of the teeth had been completed on one wheel and was just starting on the second when the picture of Fig. 2 was taken. Note the square "target patches" on both wheel rims, just to the right of the operator. A thin locating line runs through these

Figure 1—Wheels for ship-propulsion bull gears must be accurately aligned and machined to tolerances as close as three ten-thousandths of an inch. A machinist is inscribing a "target patch" on the wheels. This is to indicate the location of a line only 0.003 inches wide that is used for lining up the helixes in the hobbing that follows.



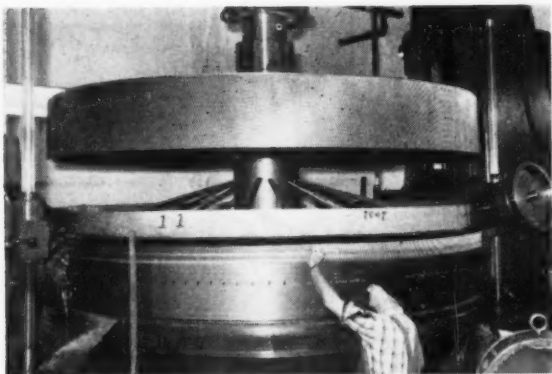


Figure 2—Hobbing of large bull gears for ship propulsion must be carried on with extreme accuracy. In this illustration teeth are completed on the upper wheel and hobbing has just been started on the lower wheel.

patches and provides reference points for lining up the helixes.

Hobbing is done by a rotary multi-pointed tool not unlike a pine cone in appearance shown at the extreme left of the lower wheel. It takes 12 minutes for the wheel to revolve and with each revolution the hob advances into

fresh metal. Both a rough cut and a finish cut are made for each wheel. A rough cut takes about 90 hours per wheel; a finish cut, 120 hours. Once the finish cut is started, the hobbing cannot be stopped until completed. Accordingly, hobbing machines are equipped with battery power that switches on instantly in case of power failure. The hobbing room and lubricating oil are kept at a constant temperature of 78 to 80 degrees F. to limit temperature changes in the wheel during the operation that would seriously affect accuracy of the machining.

When completed, this gear will become part of a complete modified C-3 type turbine power unit which the plant is building for a large Great Lakes ore carrier.

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All types of cast iron are welded satisfactorily when proper precautions are taken for these three factors:

1. Uneven expansion
2. Welding metallurgy
3. Joint preparation

Cast iron has high compression strength, but is comparatively weak in resisting tensile stress; any strong, localized stresses may cause fractures. Localized stress can be minimized by first preheating the part uniformly prior to the welding operation, and avoiding rapid cooling by covering

the part with sand or asbestos after welding.

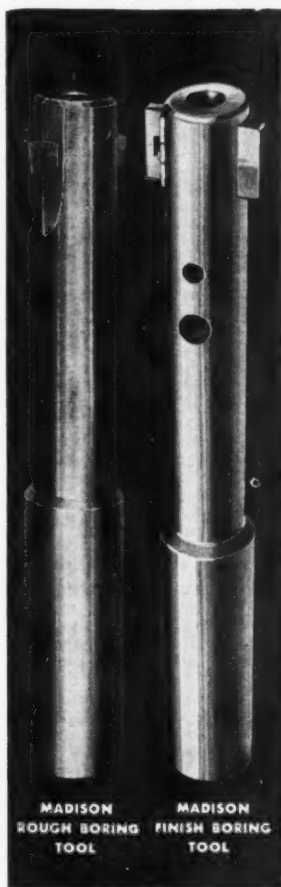
Since cast iron contains both free graphite and combined carbon, the faster that cast iron is cooled from above the critical temperature, the greater the percentage of carbon which is combined with the iron, to create its hard brittleness.

During the welding process, the liquid weld metal absorbs some of the carbon from the cast iron, creating a bead of high carbon steel. Under rapid cooling, this material becomes extremely hard and unmachinable. Furthermore, the difference in contraction rate between cast iron and the steel creates localized stress, causing hairlike cracks along the weld in the weaker cast iron. As a result, welds must be short and peened after laying every bead.

When welding a cracked casting, the operator should be certain that the casting is clean; all dirt and grit should

be removed. Kerosene or penetrating oil should be put over the entire area surrounding the crack. After several minutes, the oil should be wiped off.

Next, the welder should rub a piece of white chalk over the area where the crack may be; in a few seconds, a "wet" line will indicate exactly where the crack is. Since, in welding cast iron, it is necessary to keep the crack from spreading, this is important. With a center punch, the welder should mark the work a little beyond the end of each crack, and drill a 1/8" hole. This keeps the crack from running, and indicates metal thickness.



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SKID HANDLING

When the power lift truck made its appearance in industry, the skid necessarily came with it, and now skids are a familiar sight in many plants. In certain cases, where it appears profitable, goods are shipped on skids, allowing them to be power-truck handled at both the shipping and receiving points, without any expensive manual handling.

An interesting aspect of skid handling in some factories, where high-lift power trucks are in use, is the employment of special skid racks. Ordinarily, there are

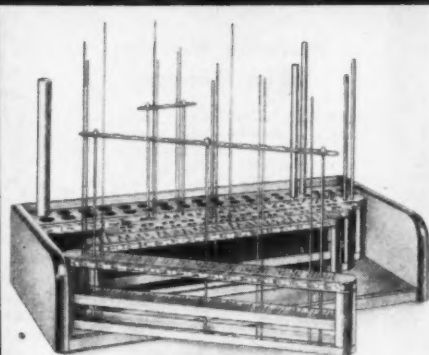
many skid loads of material in a plant, which are not in active use, but which are kept on skid storage in order to keep them readily mobile, without surplus handling. The skid racks in mind provide means for storing a large number of skids in moderately small space; they would otherwise take up much valuable floor space. One manufacturer, that provides skids of various standard and special types, also furnishes skid racks when desired. In some instances, they are designed so skids can be stacked four high. These are sectional-type racks, that can be added to as increasing need may require.

There are other methods employed for lifting skids, than the use of a lift truck. There is a standard lifting beam, for instance, which is sometimes used for this purpose, in connection with two pieces of I-beam of correct length. The I-beams are placed through open skid irons, below the

main body of the skid, the skid being designed to permit such handling. From each end of the standard lifting beam, two chains drop downward, there being an I-beam grapple at the end of each of the four chains thus incorporated. These four grapples engage the four ends of the two I-beams mentioned, in such manner that the load can be lifted level, and properly supported by any hoist. Loaded skids can be picked up and moved to any point, by bridge crane, by monorail carrier, or similar hoist-equipped unit.

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BROACHES STUCK IN WORK

Due to insufficient machine capacity, dulled teeth, or failure of power during cutting stroke, a broach might become stuck in the work. Under no circumstances should the machine be reversed, this invariably leads to breaking the broach. Rather, remove broach and work from the fixture. The broach should not be used as a lever to force the work free of the fixture, nor should a push and pull be exerted on the work itself. With the broach end supported tap the work slightly and loosen from the fixture.

With the broach and work part free of the fixture, tap the work part lightly on all sides and at the same time try to slide the broach off its starting end manually, maintaining proper alignment of the broach and the broached hole. If work cannot be dislodged a broken tooth might be wedged between tool and side of hole. Tool and work should then be placed in a lathe and the work turned down to the tool surface. Avoid heavy side loading of the broach in the lathe operation as chatter of the lathe cutting tool might result.

The work part may be sawed in half if the section is reasonably thin. If it is a small diameter broach both part and broach must be rigidly supported during this operation.

When a surface broach becomes stuck the same procedure must be undertaken. Loosen work part in the fixture and carefully retract the

broach table or pull the part away from the broach. A light force is all that is necessary in retracting the table or in pulling the work part free.

Work part and fixture should be checked to make sure that no broken pieces will interfere with further operations when they are resumed.

Broaches are precision cutting tools and should be treated as such. Provide a case where broaches are placed carefully in compartments. Nothing ruins broaches quicker than to stand them up in corners like so many umbrellas.

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The design should permit easy assembly of the parts prior to brazing, and closed assemblies should be designed to provide for the egress of gases during the brazing process.

Since brazing requires the heating of aluminum alloys above their annealing temperatures, designs involving the use of the non-heat-treatable alloys must be based on the strength of the annealed or soft temper of the material.

The strength of torch-brazed parts is approximately the same as gas welded assemblies. The heat being applied locally anneals the metal in the neighborhood of the joint to be formed. It is held in place mechanically in or around the joint or may be placed in slots or reservoirs. The volume of the filler material should be sufficient to form generous fillets.

Not enough evidence is on hand to establish definitely the resistance of brazed aluminum joints to corrosive attacks. However, there has been enough testing in salt spray, atmospheric and other kinds of exposure to indicate that the corrosion resistance of brazed joints is comparable to that of welded joints of the same alloy.

Filler material is provided in the form of clips wires, washers, bands, which are placed right at the joint to be formed. They are held in place mechanically in or around the joint, or may be placed in slots or reservoirs. The volume of the filler material should be sufficient to form generous fillets.

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Lap joints, rather than butt or scarf joints are generally used with brazing. However, in making any kind of joint, clearance between the parts is necessary for the flow of the filler material. This flow depends on gravity and capillary forces, so pressed or tight fits in assembling parts must be avoided. Clearances of .006" to .010" are suitable for laps less than 1/4" long; clearances up to .025" are used for longer laps. The correct clearance for any given joint is best determined by trial.

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KENT-OWENS *Milling Machines*

LATHE FILING

A thorough knowledge of filing is of great importance in the machine tool industry. There are literally thousands of different types of files, and the widespread uses to which they may be put would seem to be limited only by the ingenuity of the operator who understands these useful tools. The part which Lathe Filing plays when working on single, or maintenance pieces, is important.

In holding the file against a work-piece which is rotating in the lathe, the file

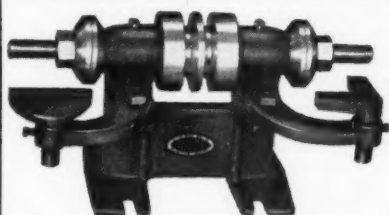
should not be held rigid, but should be kept constantly moving in a lateral motion. A slight back-and-forth stroke helps clean the file of metal particles, and also prevents making ridges on scores in the work piece.

The ordinary mill file is usually satisfactory for good lathe-filing work; there is also a special long-angle lathe file manufactured by Nicholson File Company which is provided with teeth cut at a much longer angle than those of the standard mill file. This tool provides a clean shearing action which is self-cleaning; it does away with drag or tear, and eliminates vibration. Uncut edges on this file protect any shoulders of the work piece which are not to be filed, and also protect the lathe dog.

Lathe filing is usually used for the purpose of fitting shafts. As a rule, very high spindle speed should be used on such work; where the amount of stock to be re-

moved is great, a 12" or 14" long-angle lathe file is recommended. This tool is largely used in plants to bring a shaft down to a drive fit. For a running fit, for example, where a shaft is to run on a bearing, a mill file will best provide the desired smooth finish.

Some lathe filers make a practice of running a new file over a flat piece of cast iron before using it on lathe work, in order to remove extreme sharpness from the top edges of the teeth. This is necessary, however, only on work which requires a very smooth finish. (Material: courtesy of Nicholson File Company)



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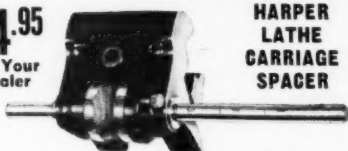
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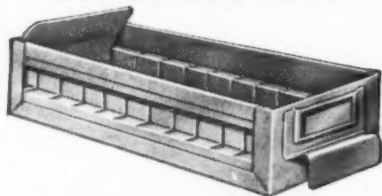
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Precision Tool catalog has been published by **Lufkin.** Everything for the machinist is listed: micrometers, calipers, gages dividers, rules, protractors, screw drivers, squares, etc. Several pages of decimal equivalents, etc. Included is a price list, illustrations, specifications. **The Lufkin Rule Co. Dept. BB., Saginaw, Mich.**

Punch Presses are described in vest pocket catalog of **L & J Press Corp.** Features highlighted in catalog are safety type toggle latch control, method of conveying bearing load direct to the frame on both up and down stroke and not through the bearing cap screws. **L & J Press Corp., Dept. BB., Elkhart, Ind.**



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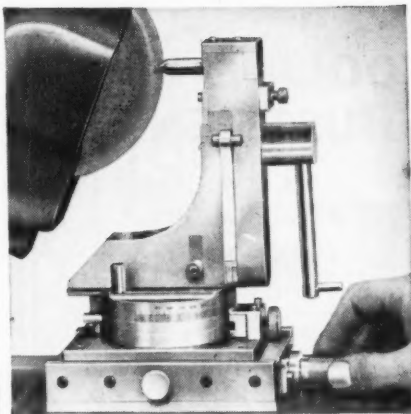


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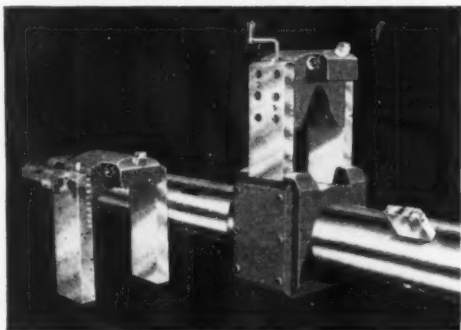
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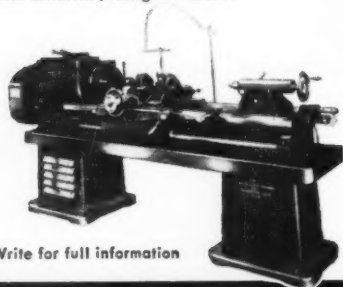
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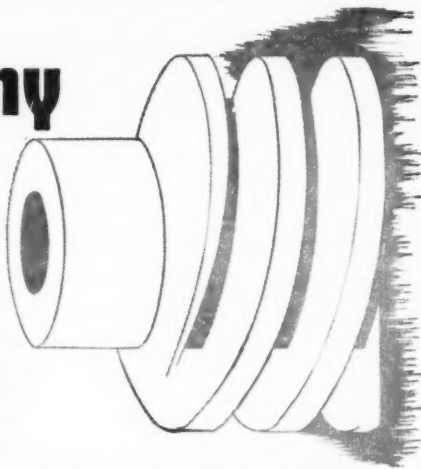
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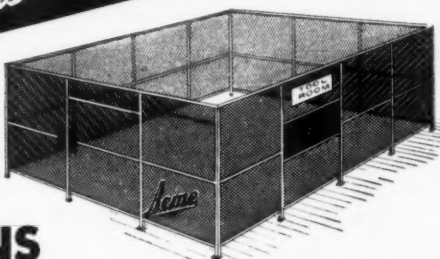
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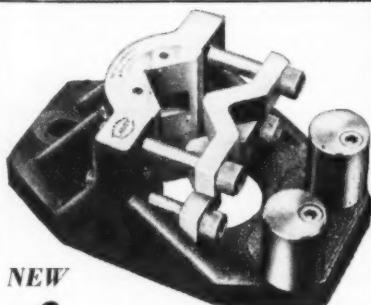
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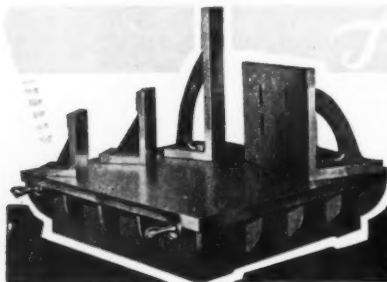
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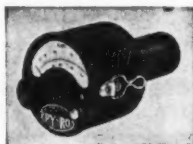
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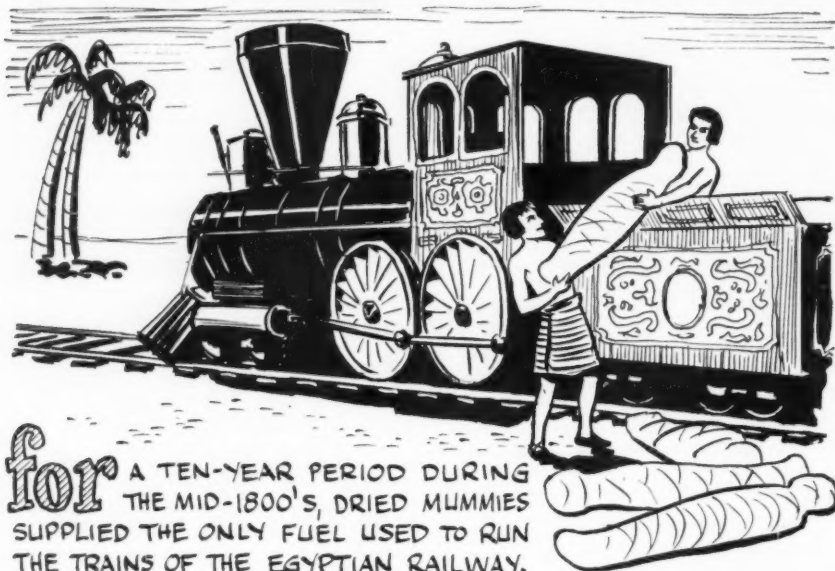
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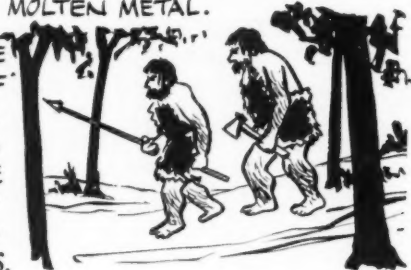


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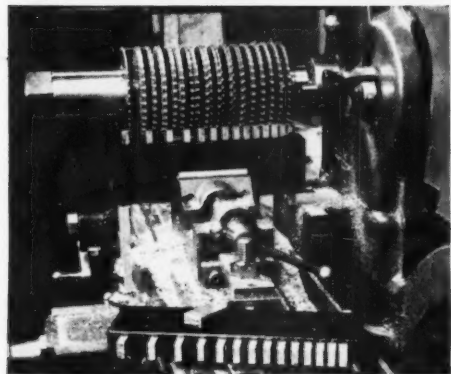


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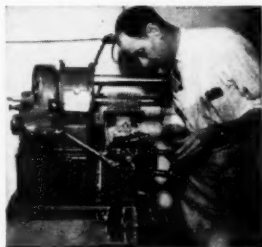
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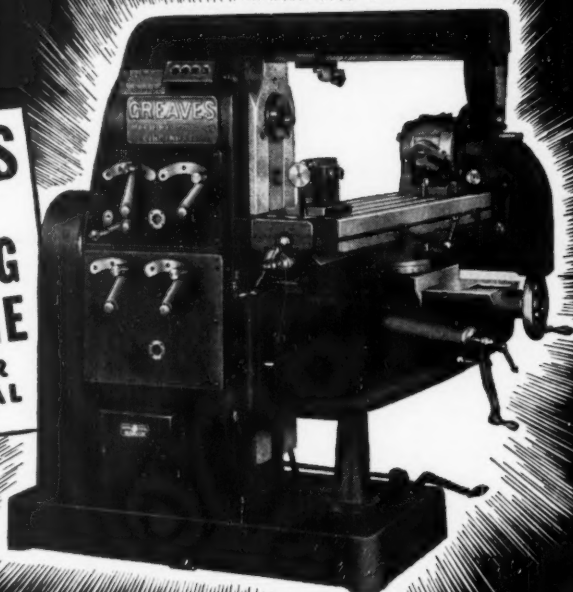
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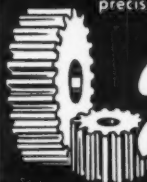
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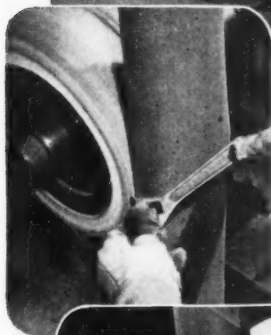
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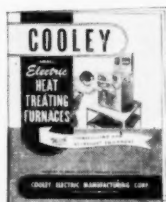


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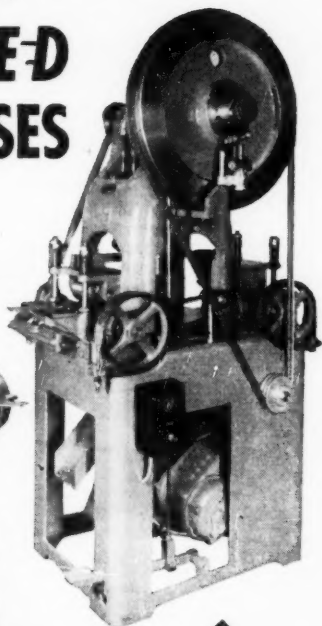
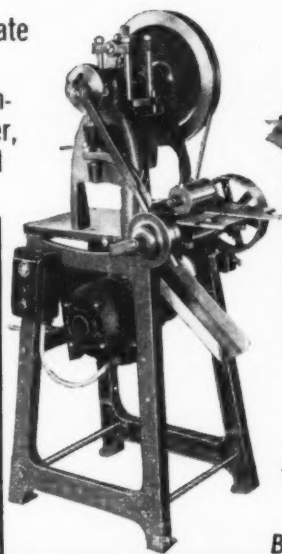
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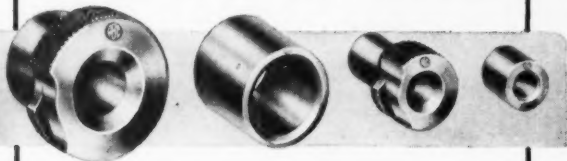
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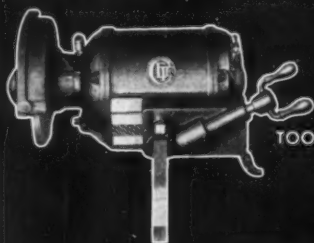
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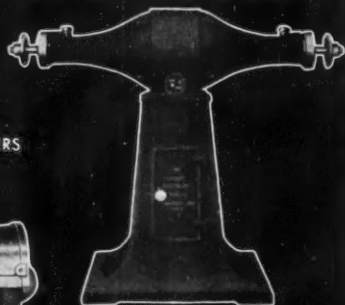
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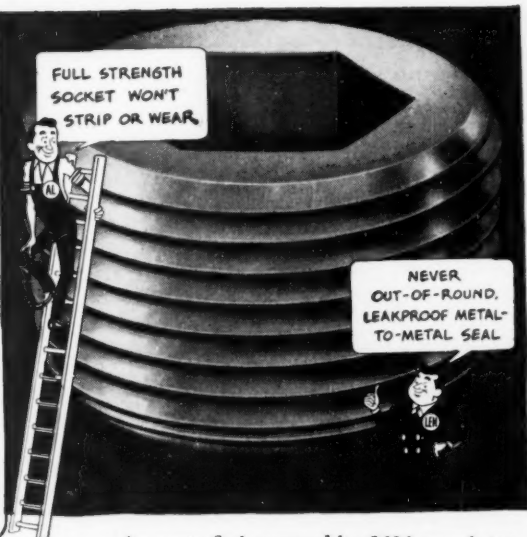
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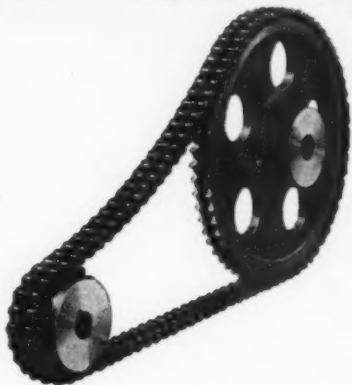
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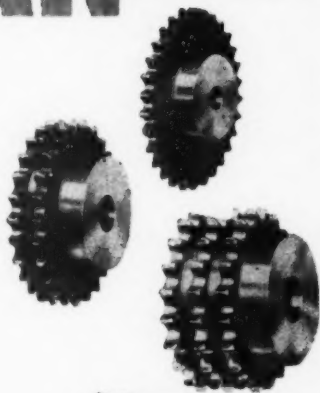
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